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# RECENT EXPLORATION IN THE WESTERN SAHARA

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Late accounts of travels in the Sahara remind us forcibly that this vast area, half as large as Europe, is, in large part, a veritable *terra incognita*. The traveler finds little of aid in the way of accurate or detailed maps, or descriptions of the topography, the animals or plants, or even of the manners of the various desert peoples which he will meet. The absence of these things, together with the inherent unfriendliness of the great desert, makes all travel across it an undertaking not to be held lightly. True on routes best known, it is especially true away from these routes, where often even the native tribes have never been, and where travel is exploration in fact.

The reason why the Sahara is as a whole so little known lies, as is well understood, in the fact that great obstacles are placed in the way of its exploration. These do not consist in the inhospitable climate only, but, among other things, in unfriendly tribes, fortunately growing fewer year by year, which are hardy peoples, living largely by preying on caravans. The leading factor which makes exploration of the desert at all possible is the camel, the "ship of the desert" in a very real sense, which can travel a week, or more, without water and food, making possible exploration where water can be obtained every 200 miles, more or less. But to-day even with the camel, and with guides, and with the protection afforded by the French, the trip across the Sahara, nearly 1,600 miles from Biskra to Timbuktu, is a *tour de force* requiring not alone much



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physical endurance but the indefinable natural ability to meet and overcome whatever hindrances may fall in the path of a pioneer.

As a rule, caravans which cross the desert are for purposes quite

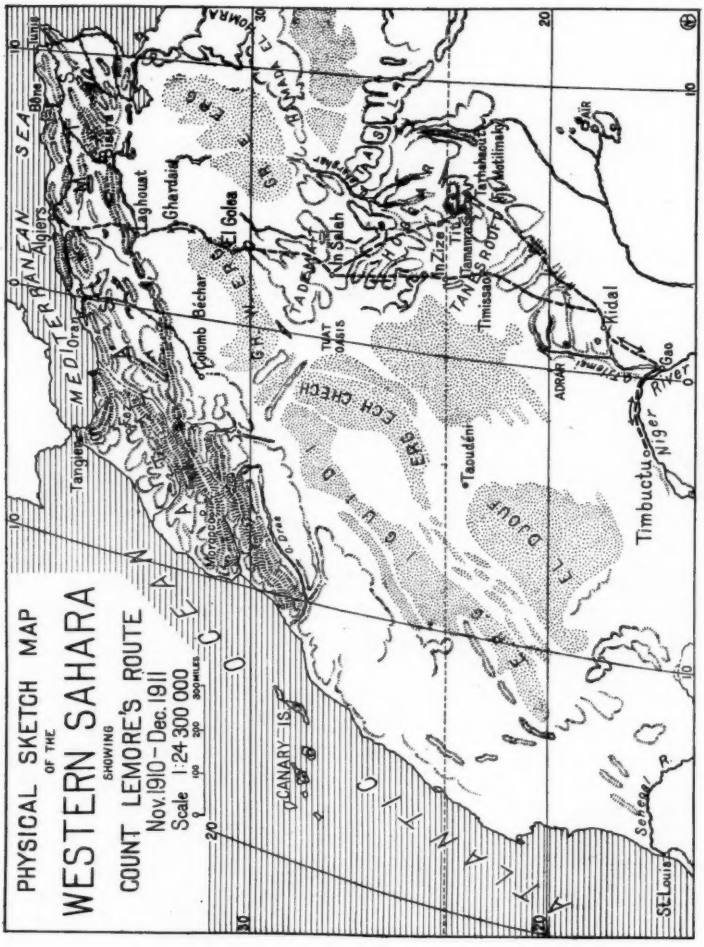


FIG. 1.

(N. B.—In the title, "Lemore" should read "Le More." On the map, for "Ft. Motilinsky" read "Ft. Motylinski.")

other than that of studying the country and its ways and such record as they may leave, of a consequence, do not give a satisfactory account of much we should like to know. Such observations as are given, however, when added to what has been done before,

are useful in gradually building up our knowledge of the great desert. Such a book is that by Count René Le More[1], a young Frenchman, who recently crossed the western Sahara twice, from Algiers to Timbuktu and return. On the way south Le More followed known paths, but on his return for a part of the route he covered territory previously untraveled. While largely a personal narrative, the book contains not a little that is of general interest and importance, especially to the French who will conquer the Sahara, if ever it is conquered, by the use of air craft. When the aeroplane branch of the French army, whose headquarters on the desert are at present at Biskra, is adequately developed, there appears to be no reason why the physiography and the natural history

FIG. 2—Le More's caravan *en route*.

of this vast area should not be fairly well known. In addition, the marauding tribes which are even now a real menace to every crossing caravan, should by means of air scouts be better held in check and finally compelled to adopt a more acceptable means of winning a livelihood. It is with such ideas in mind that Le More undertook his long journey occupying thirteen months from Algiers, of which ten months were taken up in actual travel.

Le More began the journey at Ghardaia, the ancient capital of the M'Zabites and six days by *diligence* from Algiers. Ghardaia is in the midst of the northern edge of the Sahara and thus is

[1] D'Alger à Tombouctou: Des Rives de la Loire aux Rives du Niger. Plon-Nourrit et Cie., Paris, 1913.

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surrounded by typical desert. Much of the activities of the dwellers there is characteristic of life in the larger oases. Here one finds strange oriental scenes, manners, and customs. There are large palm gardens and diminutive barley fields, where water is conserved to the utmost, and, chiefly, interesting markets in which one sees the products of the coast placed side by side with those of the far south. Here is wheat from the Tell, salt from the Oued Rhir, ostrich eggs and plumes from south of the Tanesruft desert, and dates from other oases, especially from Wargla. The small brown camel of Algeria and the large white Tuareg camel from the interior are seen and heard in all parts of the market square. Trading is carried on with great earnestness by the *bournoused* Arabs, and the hum of their conversation added to the groanings of the camels, the oriental dress, the scent of cookery and of incense, make up an *ensemble* of extreme picturesqueness.

The Ghardaia region is probably typical of much of the western Sahara. Here are plains on which lie low and flat-topped mountains. The plains are covered with stones, or pebbles, blackened "by fire from heaven", the Arabs say. At intervals one sees *oueds,* similar to the arroyos of the southwestern United States, which are usually dry but which at rare intervals are filled with a rushing torrent. Along the *oueds* there are flood plains often of considerable width, as at Ghardaia. Finally, dunes occur here and there by the Oued M'Zab. We thus have several physiographic formations which have received distinctive names at the hands of the Arabs. The fluvial deposits, possibly alluvial also, form the *reg* desert; the sand is the *areg;* the pebbly plain is the *hamada.* There are no *chotts,* or salt spots, of importance in the vicinity of Ghardaia. Of these distinct formations the *areg* and the *hamada* are the most intense deserts, usually supporting scant vegetation, if any. The part of the *chotts* most heavily charged with salts is also devoid of plant life, but the margins of the *chotts* bear characteristic halophytes. But, in the western Sahara, so far as is known, the *reg* is rarely, if ever, quite devoid of plant life. Some characteristics of the physiographic formations mentioned, as well as of the plants which are to be found on them, and of the Ghardaia-Wargla region, have already been given in the *Bulletin*[2], to which the reader is referred. In following Le More across the Sahara it will be seen that much of the country traversed by him is *hamada,* or mountainous, and that relatively little is *areg. Oueds* and their

[2] W. A. Cannon: Some Features of the Physiography and Vegetation of the Algerian Sahara, *Bull. Amer. Geogr. Soc.*, Vol. 45, 1913, pp. 481–489.

flood plains, *reg* desert, were followed for great distances, partly because of food for camels, and partly because dug wells occur only in connection with *oueds* or the *reg* desert.

### Le More's Journey: Ghardaia to Timbuktu and Return, November, 1910, to December, 1911

It chanced that the writer of this sketch was in Ghardaia at the time Count Le More departed on his long journey.[3] Although apparently well considered, the outfit seemed to the observer extremely meager for so great an undertaking. There were two servants, of whom one was cook and guide and the other the cameleer, two baggage camels, small beasts from the northern part of the desert, and one fine white riding camel (Fig. 2). The latter animal, a *mehari,* was a Tuareg camel probably from the Adrar region south of the Tanesruft desert. Of this outfit, both Arabs went to the journey's end and returned with the traveler, and the *mehari* came back as far as In Salah. Baggage camels were hired or purchased from time to time as required. Although the personal outfit of Le More was not increased beyond that above given, there were added to his caravan from time to time, as is the custom of the desert, various individuals and small caravans, joining forces for mutual protection against highwaymen, or for companionship. For much of the trip, however, his party traveled separately.

By the route followed two important oases were seen, El Golea and In Salah, and two French posts, Ft. Motylinski and Kidal. The position of these are indicated on the accompanying map (Fig. 1). Between these widely separated places there were seen a few Arab villages, but, for the most part, the wells visited were in the open desert and were used by nomads or caravans only, and were not the sites of the villages. Only one European—and he was a soldier on special duty—was encountered *en route.*

The first leg of the journey, requiring eight days' march, ended at El Golea, about lat. 31½°. Every 30 or 40 kilometers *bordjes* were met, which are fortified water stations, and the passage was accomplished with little incident. Along the *oueds* there was found sufficient pasturage for the animals.

El Golea is a prosperous oasis with an abundance of water.

[3] As Le More had no camera, the writer persuaded him to take one of his kodaks with him. Le More did so and had remarkably good success when it is considered that he had no prior experience in photography. The accompanying views were made by him with this instrument. As Le More's book is not illustrated, these are the first pictures of his trip to be published. Their value is enhanced by the fact that views of the Central Sahara, especially away from the army posts, such as those of the Hoggar and the Tanesruft (Figs. 6-8 and 12-13), are not frequent.

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Here are raised grains, vegetables and fruits; of the latter, the date is the most important. At El Golea, also, the French have established a post and maintain a small garrison.

Between El Golea and In Salah, about lat. 27°,—a journey which required 13 days of travel—the country is somewhat mountainous and probably the altitude somewhat higher than at El Golea. In the *oueds,* which wind about among the mountains, there is to be found a fairly dense growth of small herbaceous plants and shrubs, providing abundant food for the camels (Fig. 3). In addition to mountain topography, there are wide stretching plains, *hamada,* which, as is usual with this formation, is almost wholly barren (Fig. 4).

FIG. 3—In camp between El Golea and In Salah.

In Salah is an important oasis in many regards. It is on several main caravan routes, as, for instance, from Morocco to Tripoli and from southern Algeria to the Niger, and before the French occupation it was an active slave mart. At the oasis there is an army post,—the only important one in the Sahara (Fig. 5). The position of In Salah can be best appreciated, perhaps, when it is stated that by the present usual means of travel it would require one month to go from the oasis to Algiers, and, yet it is only on the threshold of the great desert!

Between In Salah, which is in the Tuat region, and the Niger by the route taken by Le More, there are about four great physiographic areas, namely, the mountainous region of the Hoggar (Figs. 6, 7 and 8), the Tanesruft desert, the Adrar mountains, and the

Tilemsi drainage area. The Tanesruft is the most intense desert of the western Sahara and lies in about lat. 22°. The two mountainous regions, Hoggar and Adrar, lie to the north and to the south of the Tanesruft. The Tilemsi River, practically a large *oued,* runs from the Adrar region to the Niger. After leaving In Salah, Le More's objective point was Ft. Motylinski in the Hoggar, a march of 29 days.

Beyond In Salah all caravans crossing to Timbuktu must be completely outfitted, and, also, they must be able to defend themselves against attack, as there is little law or order beyond the sound of French guns.

Le More's caravan was increased by two soldiers returning to

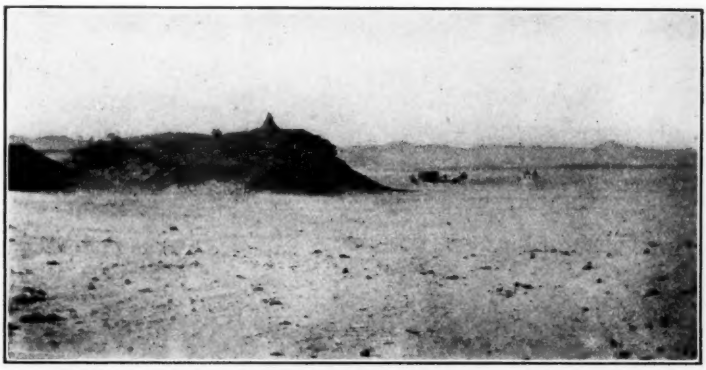

FIG. 4.—View on the *hamada* between El Golea and In Salah.

Ft. Motylinski, so that the little company mustered eight guns all told. The departure from In Salah was made on December 3. The season was most pleasant for desert travel. The daily temperatures ranged from 30° C. in midday to –3° C. at night, which is a range of about 60° Fahrenheit. Between In Salah and the Hoggar lies a desolate plateau, where for 80 miles or more, there are no wells,[4] and here, apparently *hamada,* there appears to be no vegetation whatever. In the *oueds,* however, shrubs are to be found. As the Hoggar is approached and reached the vegetation increases, until it is not inconsiderable[5]. The mountains attain an altitude of 6,000 feet or more.

[4] A. H. W. Haywood: Through Timbuctu and Across the Great Sahara. Lippincott, Philadelphia, 1912 [for review, see *Bull.*, Vol. 45, 1913, p. 57. Ed.].

[5] M. Chudeau collected 155 species of plants in the Hoggar, according to Battandier and Trabut, *Bull. Soc. Bot. de France,* Vol. 53, 1906.

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On Christmas day Le More met the only European encountered *en route*. This was in the Hoggar. The man was a French sergeant in charge of a well-digging and cleaning squad of Arabs. The "puisatier" had been in the field three months without seeing a European. The meeting was a happy one to both parties! Thanks to the work of these men, water could be procured at least every three or four days in the Hoggar. About one hundred years ago, during a war between the Chambas of the northern Sahara and the Tuaregs, many of the ancient wells were filled, or otherwise destroyed. In this manner an impassable barrier was created,—a neutral zone which enforced peace. The wells are from 10 to 20 meters deep in the Hoggar and the water is usually good.

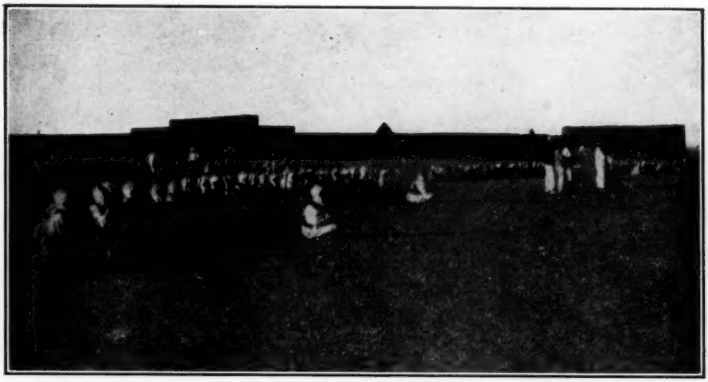

FIG. 5—Company of desert police, *méharistes*, watching artillery practice at In Salah.

Two small towns were seen in the Hoggar which are of a certain interest for different reasons. The first of these, Tit, is situated on a wide plain with mountains rising north of it to a height of 2,400 feet or more. The place is famous in desert warfare as the scene of a fierce battle waged between a few French and many Tuaregs, in which victory went to the French, and with it passed the control of the western Sahara. This was in 1903, since which time only isolated and unorganized bands of highwaymen, serious enough, to be sure, are to be encountered in the desert.

Not long after leaving Tit the village of Tamanrasset was seen. Tamanrasset is situated in a vast gravelly plain (*hamada ?*), which, however, is not so arid as this formation is usually (Fig. 9). Large tufts of shrubs or half-shrubs are scattered over its surface. At

the village live two men of importance—for very divergent reasons. Of these, one is Père de Foucault, otherwise known as the hermit of the Sahara. He is providence to all unfortunates, and is adored by Chambas, Tuaregs and the French alike. Formerly a French officer, Vicomte de Foucault, he joined the White Fathers, explored very largely the western Sahara, when, at times, he assumed great personal risk. It is said that at present he is engaged in compiling a Tuareg dictionary. Near Père de Foucault lives Moussa Agamastane, grand chief of the Hoggars, really sheik, who was formerly the active enemy of France, but who now as actively

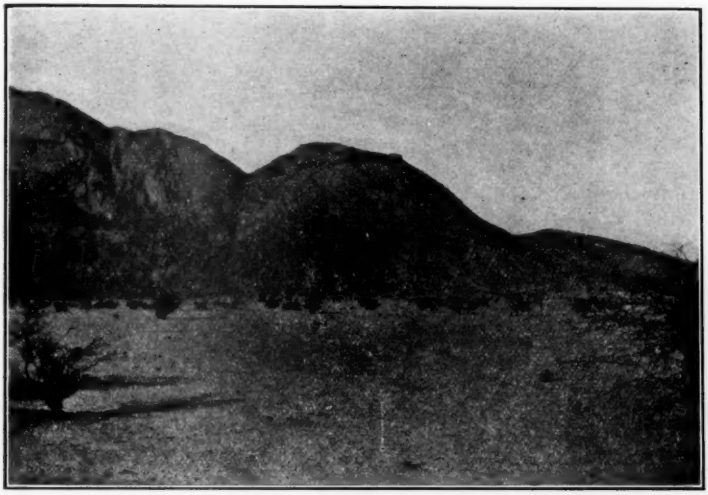

FIG. 6—View in the northern Hoggar region. Scene of Le More's meeting with the "puisatier."

supports the French (Fig. 10). Through the aid of Moussa companies of camel police, *méharistes,* have been organized to patrol this portion of the desert. He assisted, also, in the construction of Ft. Motylinski, on the southern edge of the Hoggar, where a post was built in 1909. The leading industry of the dwellers at Tamanrasset is the raising of camels, although the center of this industry is in the Adrar region, south of the Tanesruft.

In commenting on some customs of the Hoggar, Le More says that the women of the region have a very different standing from the women of the Sahara farther north. They are not veiled; in this they are like the lower caste Arabs, and they enjoy other wide liber-

ties. Property and the family name appear to descend through the female line. Much of the personal freedom, however, is lost on marriage. Monogamy usually obtains, although the chiefs may have more than one wife.

Immediately after leaving Tamanrasset the route passes through mountains, some of which are 6,000 feet high or more and are the highest in the region. The French post, Ft. Motylinski, in the southern Hoggar, was reached the first week in January, and a well earned a rest of ten days was enjoyed.

At Motylinski, where at the time ten French soldiers were sta-

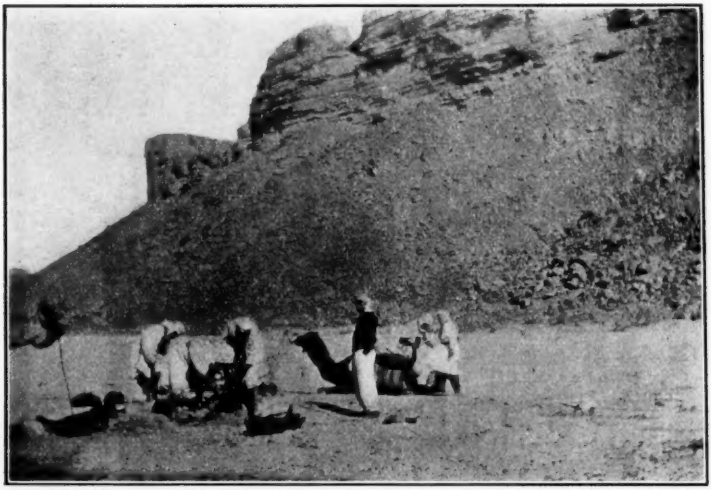

FIG. 7—Gorge of Takumbaret, northern Hoggar region, three weeks from In Salah. The gorge is about 50 kilometers long and is usually less than 100 meters wide. It supports a shrubby vegetation, which, however, is rather sparse.

tioned and about a company of native troops under their command, the first definite news of highwaymen was received. Soon after Le More's arrival at the post an officer and his men returned from chasing a band of robbers who had plundered a caravan between there and Kidal. The robbers had killed several men and taken many camels. At the post Moussa Agamastane was seen and interviewed. The famous native chief understood only Tuareg, his secretary only Tuareg and Arabic. Le More talked only French, and his servant only French and Arabic. Although conversation under the circumstances dragged somewhat, Moussa was found to

be a very interesting man. His views on Paris, where he had been once taken by the French, and of French customs were very amusing.

Motylinski was left on January 15 and Kidal, beyond the Tanesruft was reached in 30 days. South of Motylinski the mountains became less high, the streams are fairly numerous, and irrigation is practiced to a certain extent by the Hoggars. Vegetation, especially along the *oueds,* is relatively abundant and the plants are of good size (Fig. 11).

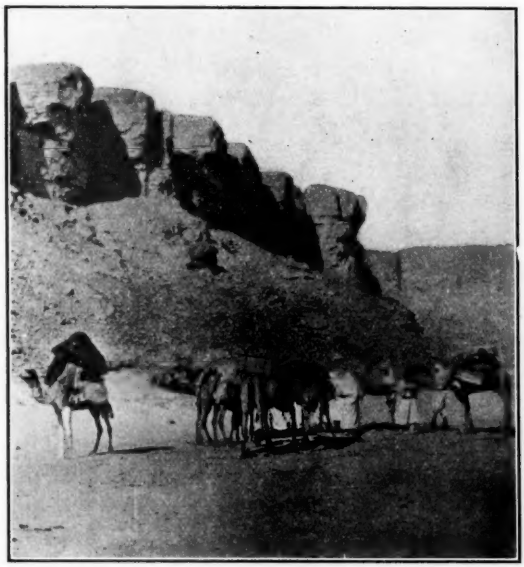

FIG. 8—View in the Hoggar region.

About two days after leaving Motylinski, le More reached a small Hoggar village, Tidjenoem, where he was well received and where he noted some interesting customs. The leading men brought him milk and eggs,—the latter being rare in the Hoggar. Domestic poultry holds a peculiar position amongst the villagers. They are a heterodox Moslem sect although, at present, there remain but slight traces of the deflection, and this is to be found in the attitude of the people towards poultry. Among the sect the cock is taken to represent the muezzin in announcing the seasons for prayer! As a result chanticleer, as well as his female relatives

and friends, enjoy great prestige. So much is this the case that poultry, or even eggs, are eaten only in case of real need. Therefore, the gift of eggs had, in the minds of the donors at any rate, not a little significance.

Upon leaving the mountainous Hoggar the country becomes more and more desolate. The tufts of herbaceous plants and of shrubs become less frequent and more stunted. Finally all plants appear to be left behind and a truly desertic zone is entered—the Tanesruft—which required 5 days to cross. The Tanesruft is perhaps the most extensive region without water in the western Sahara. It is part of an arid belt which stretches from the Lake Chad region westward to near the ocean. There appears, from the ac-

FIG. 9—General view on the plain at Tamanrasset.

counts left by some travelers across it, not a little variation in the topography of the belt. Somewhat to the east, the surface is a "sea of rocks",[6] and to the west "a monotonous stretch of sandy plain".[7] Where Le More crossed the Tanesruft it is described as being a level and sandy plain, where the sand storms may at times be very severe. The area, noticeably more arid than the surrounding portions of the Sahara, although thus extremely desertic in character, supports, nevertheless, some vegetation (Fig. 12). This, however, is extremely meager. It is true desert in all of its horror,—not a

[6] F. Foureau: D'Alger au Congo par le Tchad. Masson, Paris, 1902.
[7] A. H. W. Haywood: *op. cit.*

bird, not a sound, not even traces of the gazelle which is abundant in other parts of the great desert (Fig. 13). Although at present thus desolate, the region gives indication of having been inhabitated at a remote time. This is evidenced by the presence of prehistoric tombs. Around these tombs the Tuaregs have gathered curious superstitions, believing them the dwelling places of spirits. Le More says that when the women of a tribe are without news of overdue caravans, one of them clothes herself in her best garments, and, leaving everything metallic behind, lies near one of the tombs and believes that in answer to her prayers the mysterious host appears. He has, she says, eyes like those of the camel, and he reveals to her the fate of the absent ones.

Finally after having gone nearly 200 miles without water, five days' march, herbage again appears. Tufts of shrubs are seen

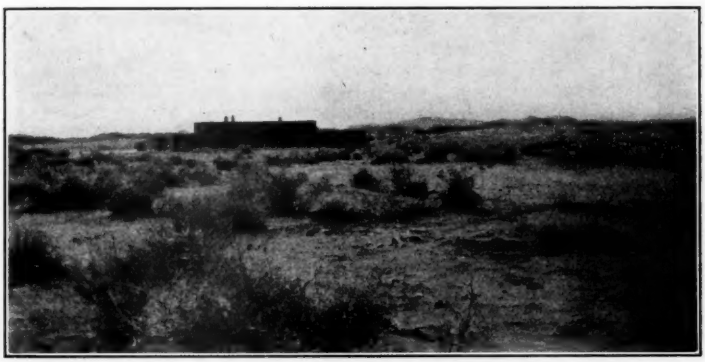

FIG. 10—House of Moussa Agamastane, chief of the Hoggars, at Tamanrasset.

and groups of trees curiously perched on buttes a few meters high. On the southern edge of the Tanesruft, also, there are rocks of fantastic shape, eroded by sand through wind action, which for several kilometers give a bizarre aspect to the landscape (Fig. 14). Leaving this region the Adrar is entered,—a mountainous country where the valleys are wide and the mountains are not as high as in the Hoggar. Vegetation is more abundant in the Adrar, and also, there is much game.

The Adrar had hardly been reached when signs of the presence of desert robbers were met, and Tuaregs were seen who had been attacked by them. The Adrar is especially subject to the ravages of highwaymen who come across the desert from Morocco, renew their stock of camels in this, the center of the camel raising industry,

and drive off other domestic animals. Le More's party, however, were extremely vigilant and escaped the notice of the robbers.

The Adrar ending sharply, the travelers emerged in a large valley, that of the Tilemsi, in which lies the road leading to Kidal, and ultimately to Gao and the Niger. The Tilemsi, thought to be the bed of an abandoned immense northward bend of the Niger, supports to-day much vegetation, and, in times past, the valley was probably well populated. At present, however, owing to the incessant raids of robbers, it is almost a desert.

Kidal was reached on February 15. This French post, like the one at Motylinski, has been recently established. It is an ancient

FIG. 11—View in a *oued*, to the south of Ft. Motylinski, southern Hoggar region.

village, possibly formerly inhabitated by negroes; to-day the huts of natives, Tuaregs, surround the post.

From Kidal to the Niger, the country is only semi-desert. Here the valleys, especially the Tilemsi, harbor much vegetation, including trees, and the vegetation increases in amount, and in size, as the Niger is approached. A curious condition was observed in the Tilemsi valley where there were zones of dead trees alternating with zones of the living. The killing may have been due to excessive drought, since Hayward, in describing the same phenomenon, remarks that no rain had fallen for five years.

Gao, on the Niger, was reached on February 25, and Timbuktu

on March 15, and the first half of the long and difficult journey was over.

Le More remained in Timbuktu until mid-July, during which time he made plans for the return over the desert, and recuperated from the long journey just completed.

On the route back to Algiers it was proposed to go over a portion of the desert hitherto little known to Europeans, and, possibly, never traversed by them. It was Le More's plan to return farther west than the southward journey, and to reach southern Algeria and the railroad at Colomb Béchar, on the Morocco-Algeria boundary. The route would be by Taudeni. The advantage of this route as a track for future caravans to follow, or for an aeroplane route, are mainly two, namely, it is the shortest way from the Niger to the

FIG. 12—General view in the Tanesruft desert.

southern terminus of the railroad, and it possibly includes the greatest number of oases. The disadvantages, as felt at the moment, lie wholly in the large numbers of robbers who frequent a portion of the route. Le More soon became aware of the real strength of the robbers. In attempting to engage men and guides for his return, he found great difficulty. All of the leading natives, merchants, *marabouts,* and chiefs of tribes counseled against the plan, and were very plainly either in direct league with the robbers, their secret agents, or feared offending them. It was only after much effort that a guide was secured and all arrangements made to return by the desired way. Upon reaching Gao, however, Le More was informed by the army that the robbers had been very troublesome of late and that he would not be permitted to return over the

route as planned. When the necessity of a change in plans became apparent, Le More, with the counsel of the French officers, decided to retrace his route to Kidal, but from there to In Salah to go direct and by a route not previously taken by Europeans. This way, as the accompanying map shows, lies to the west of the southward passage, and is much shorter. From In Salah northward the same route would be taken as was taken when south bound.

Leaving Gao on August 18, Kidal was reached on September 25. The first part of the return was made more difficult by reason of fever which Le More and his men suffered and by the summer heat.

Summer is the season of rain in the southern Sahara, so that the Tilemsi valley had a luxuriant vegetation. The annuals were

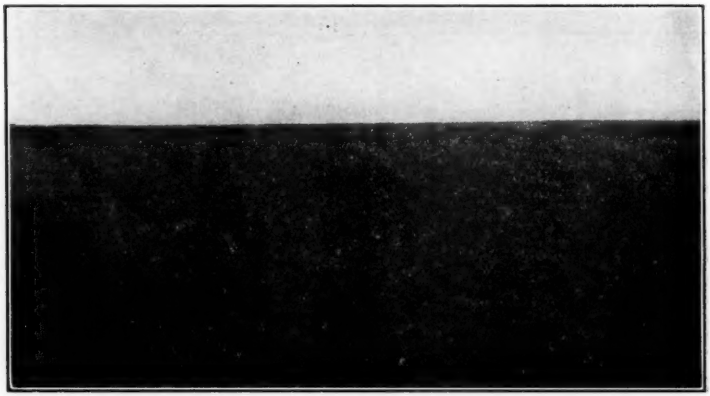

FIG. 13—General view in the Tanesruft desert.

abundant and attained a height of 30 to 40 centimeters. Such fertile zones were crossed by sterile ones, in which the summer vegetation was lacking. One day a prairie thickly covered with green vegetation was crossed, the next day a dusty and barren zone was encountered, to which there succeeded an open forest of spinose species (*Acacia ?*), which appeared in the distance green and in flower. No explanation was offered for this peculiar variation in the vegetation.

At Kidal there were rumors, soon confirmed, of robbers in the Tilemsi region. Tuaregs, loyal to the French, had been driven from their pastures by the brigands, and traces of these freebooters were to be seen everywhere. On this account Le More's little party had to be extraordinary careful, parking their beasts near camp,

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remaining away, as much as possible, from wells, and maintaining constant watch.

One of the most common customs of the desert may be shown by an incident which took place not long after Le More left Kidal. A party of Tuaregs was encountered who had the intention of driving a band of sheep and camels to In Salah for sale. They had about given up the project because of danger to themselves and their charge when Le More was seen. Asking to be allowed to join his caravan, they agreed not to hinder his march in any way, and would aid whatever way possible. Thus, Le More became the *de facto* chief of a desert band, and distributing arms and ammunition among them, felt more secure against the robbers. The Tuaregs

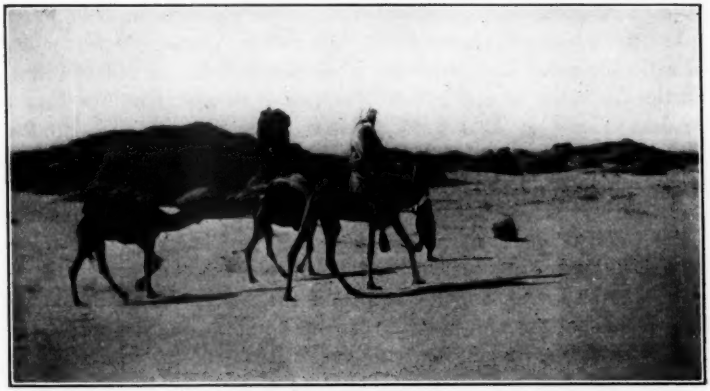

FIG. 14—Effects of sand erosion between the Tanesruft and Kidal.

had about 400 sheep and 50 camels in their band, and it is interesting to note that, despite the very great hardships met in traversing the Tanesruft and the usual shortage both in food and in water, only about 25 of the sheep succumbed before arriving at their destination. On the Niger the sheep are worth about 2 francs, in the region south of Kidal they bring 4-5 francs, north of Kidal their value increases to 7-8 francs, and at In Salah they are worth 12-15 francs each.

Leaving the valley of the Tilemsi, after having traveled in it 13 days from Kidal, a small mountain range, parallel to the valley, was crossed and a wide valley entered. The latter became more and more desertic in character and led to the Tanesruft. In the rocky valley, whose floor is of sand and without vegetation, there are excellent wells, the last before entering on the dreaded Tanesruft. The

place of the wells is called Timissao. There are no dwellers at the wells.

Upon leaving Timissao the Tanesruft was entered and, after four days' forced marching, was crossed. At the place of crossing the desert was of sand, flat, and there were pronounced mirage effects. Apparently wholly barren, there were found occasionally broom-like shrubs which were eaten to the roots by the camels. On the third day a sandy barrier, running east and west, was encountered, which was 100 to 150 meters high and about as broad at the summit. Two other sand ridges of the same character were subsequently seen and crossed. These were about 40 kilometers apart. Between the two northernmost ridges Le More's party found the remains of a French officer who had been surprised and murdered by robbers a few months previously. The bones were gathered up and taken to In Salah for interment. Soon after crossing the last ridge of sand the rocky northern edge of the Tanesruft was reached and, on the following day, a pool of water high in the rocks was found (Adrar Nahlet). This water, however, was not accessible to the beasts, who had to endure another day before arriving at In Zize, where water was to be had in abundance.

In Zize is 18 days of march from Kidal and about 12 from In Salah. Like Timissao, to the south of the Tanesruft, there are no habitations of any sort at the well. Here, however, some vegetation is to be found, and the tracks of the gazelle are again met—certain indications of a more favorable climate.

Soon after leaving In Zize[8] Le More's Arab guests departed for a region of better pastures somewhat to the west. Grave danger from attacks by the robbers were over, and the party, increased by three Tuaregs who were going to In Salah to obtain certain permissions of the government, journeyed the balance of the way to In Salah in comparative comfort. The route went through a fairly rough country, where the valleys bore a relatively rich vegetation, and the wide plains, *hamadas,* were barren. Three days before being due to arrive at In Salah Le More parted with his baggage camels and made a forced march to the post. He was impelled to do this in part from desire to have a rest from the long and tiresome journey, and in part because his provisions were nearly exhausted. During the days of forced march, about 100 kilometers per day were made. At a point 20 kilometers south of In Salah the route

[8] It is evident, from Haywood's account, that he crossed the Tanesruft from Timissao to In Zize along the route followed a few months afterward by Le More. But from In Zize their routes must have been different, since Haywood speaks of entering the Tanesruft a second time, while Le More passed through a rough country, really an extension of the Hoggar.

followed over a year before was first seen. In Salah was reached on November 8.

After resting a few days at In Salah the traveler pushed on to Ghardaia, where he arrived December 13, after having traversed about 2,400 kilometers of desert,—a fine record of endurance.

### Le More's Direct Results and Conclusions

In addition to giving descriptions of new or little traveled parts of the western Sahara, glimpses of some of the customs of dwellers in the desert, and, among other things, some account of the climate during his sojourn in Africa, Le More gives notes on the sources of water on the route between Ft. Motylinski and Kidal, and between the latter place and In Salah. He gives also his impressions concerning the feasibility of conquering the desert by aeroplane, and outlines a new and shorter caravan route between Timbuktu and Algiers.

The extreme scarcity of water is well illustrated by Le More's notes. Between Motylinski and Kidal for example, out of the 21 days required to make the passage, water was carried 17 days. And from Kidal to In Salah, a journey requiring about 44 days, water was found at 12 places only!

Crossing the desert by aeroplane is considered by the author as feasible and highly desirable. He points out that an established aeroplane service would be of great military advantage to the French, making the subduing of the robbers less difficult, and uniting the French possessions on both sides of the Sahara. Also, it would greatly facilitate the carriage of mails and despatches. In place of requiring three months, as at present, 10 days should suffice to carry mail by aeroplanes from Timbuktu to the railroads in Algeria.

Finally, Le More suggests a new caravan route to the Niger, and proposes at some future time to traverse it.[9] This route would run from the end of the railroad at Colomb Béchar to Timbuktu by Taudeni, which is an important center for obtaining salt, and would reduce the distance between Biskra and Timbuktu from about 2,500 kilometers to about 1,800 kilometers, and would effect a proportionate saving in time. It is estimated that the passage via Colomb Béchar could be accomplished in 40 to 50 days by camel.

[9] Since the above was written, the unwelcome news has been received that Count Le More died of fever on October, 1913, at Gaboon, in the French Congo. The young explorer, who was 26 years of age at the time of his death, was on his way to the Congo from whence he planned traveling to Lake Chad, and from Lake Chad his route was to lie across the Sahara once more to Algeria.

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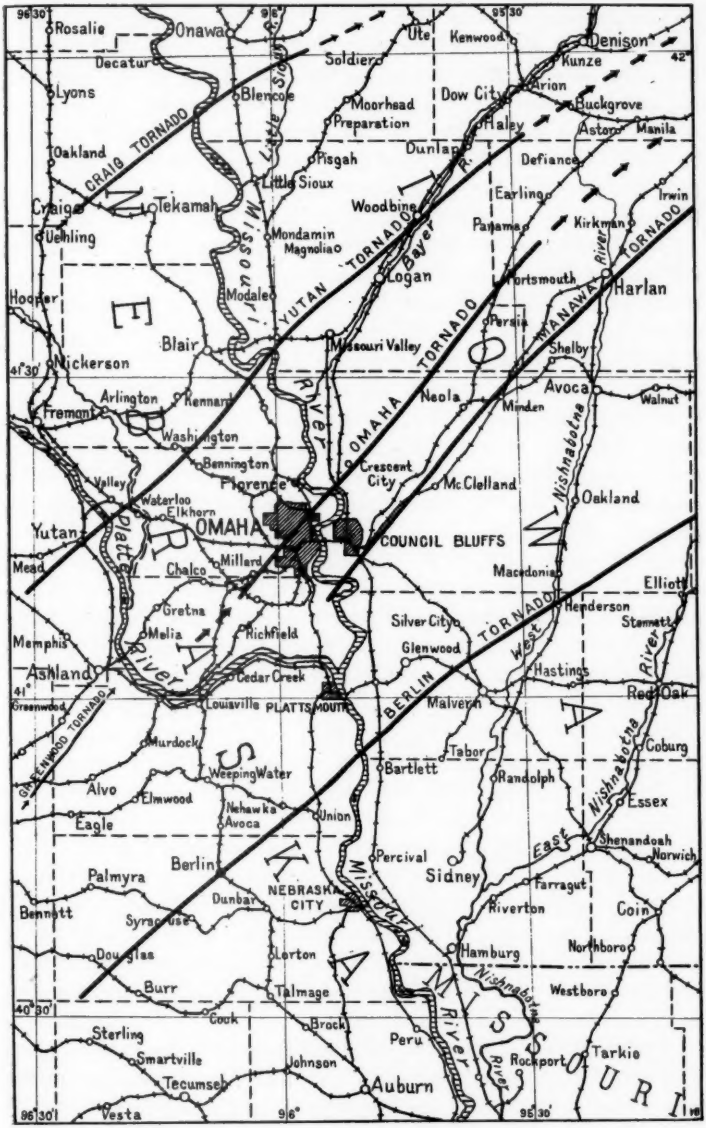
# THE IOWA-NEBRASKA TORNADOES OF EASTER SUNDAY, 1913

By G. E. CONDRA and G. A. LOVELAND
University of Nebraska

Unusual atmospheric conditions passed over Nebraska and Iowa on March 23, 1913, developing five tornadoes, which did more damage in Nebraska than all those previously recorded. Immediately after these storms a thorough survey of the districts affected in Nebraska was made under the direction of the Nebraska Conservation and Public Welfare Commission. The writers of this paper traveled over the tornado paths, mapped them, and observed the effects of the storm upon forests, farmstead improvements, towns, farm animals, and people. This paper briefly reviews the results of the field survey giving the distribution, phenomena and effects of the storms.

*Weather Conditions.* The tornadoes occurred as local developments in a cyclone of much energy and about average size which moved across the country from the Pacific coast to northeastern Michigan from March 21st to 24th. The morning weather map of March 23, 1913, shows the cyclone as a well defined area of low pressure covering the southern Rocky Mountain region, the center in northeastern Colorado with a pressure slightly less than 29.40 inches. This area moved eastward and slightly northward during the day, across Kansas and Nebraska, and twelve hours later, at the evening observation, 7 p. m., the center was in western Iowa, with a pressure between 29.25 and 29.30 inches. In the late afternoon, between 4 and 5 o'clock the center of the area crossed eastern Nebraska, not far north of Lincoln and Omaha. Between 5 and 6 p. m. a layer of very unstable air covered a large area, ten or twelve counties, in southeastern Nebraska. At that time the unusual appearance of the clouds indicated a violent disturbance in the upper atmosphere, that is, at the cloud level and above. The clouds were low and moving rapidly, of a weird greenish yellow color, tinged purplish in places and rolling or tumbling somewhat like boiling water. They were for the most part cumulus or stratocumulus in formation, developing later into cumulo-nimbus. In a considerable part of this area a reddish dust settled from the upper atmosphere preceding the tornadoes. The dust was probably taken up from the ground by air currents.




Distribution of the Iowa-Nebraska Tornadoes of March 23, 1913.
By G. E. Condra and G. A. Loveland. Scale, 1:1,150,000.

The temperature was high during the afternoon of March 23d, but far below the record for that time of the year. The relative humidity, not unusually high, was between 75 and 85 in the morning and late afternoon, but fell rapidly with the rising temperature as shown by the trace sheet of the hygrograph at Lincoln. It was 53 at 3:50 p. m. and 78 only forty minutes later. The pressure and relative humidity both fluctuated very much between 4 and 10 p. m.

The barometer fell in southeastern Nebraska all day of March 22d and on the 23d until the time of the tornadoes. The fall was steady and not unusual, except that it was rapid on the 23d and to a very low reading. The fall at Lincoln on the 23d was .44 inch from 7 a. m. to the lowest reading at about 5:45 p. m., which was 27.94 inches actual pressure or 29.19 reduced to sea level. At Omaha the fall was .58 inch for the same time, the lowest reading being 27.93 inches or 29.09 reduced to sea level. This barometer was three-fourths of a mile from the track of the tornado and so recorded the pressure in the cyclone area rather than in the tornado path.

On the morning of the 23d in southeastern Nebraska the wind was from the south, with a velocity of eight to ten miles an hour, but it increased rapidly to between twenty and forty miles an hour by 9 a. m., remaining so until the time of the tornadoes. It then turned to northwest but continued high. There was no decided decrease in the regular southerly wind just preceding the tornadoes.

In forming the tornadoes the air of the lower layer probably moved upward, rapidly forcing its way through the mass of cold air that was moving northeastward in the upper atmosphere, thus causing considerable disturbance, as indicated by the movement of the clouds. If so, the storms were phenomena caused more by the turbulent air at and above the cloud level than by conditions in the lower levels, the tornadoes being lower manifestations of the violence in the upper air. They moved in a northeasterly direction, in parallel lines, because the upper atmosphere was moving rapidly in that direction. A light fall of rain or sleet immediately preceded the tornadoes at most places. A slight rain was general in southeastern Nebraska during the passage of the cyclonic area. The rainfall accompanying the tornado at the majority of places where it was measured was less than .5 inch, only exceeding .75 inch at a few places.

*Five Distinct Tornadoes.* We named the tornadoes from the

points of their greatest destruction. It is a remarkable fact that five distinct tornadoes (see map) moved northeastward in nearly parallel paths at about the same time in this cyclonic area with only ten to twenty-five miles between them, all crossing the Missouri River within a distance of eighty miles. It was difficult to obtain the correct time each passed a given point, and thus ascertain its rate of movement. From the data at hand, however, we conclude that the Craig tornado was slowest and that the others moved across the country at a rate of fifty to sixty miles an hour.

The counter-clockwise circulation of the air in the tornadoes was observed by many persons and was plainly shown by the distribution of debris in the storm paths. The tornado clouds were nearly cylindrical, of large diameter, and appeared short because the cloud level was low. They were nearly straight or slightly curved, moving with the lower extremity apparently dragging.

*Craig Tornado.* This formed about 5:25 p. m. a few miles southwest of Craig, Nebraska. It passed over part of Craig, and through rural communities to Iowa in a course of thirty miles. It was not violent in comparison with the other tornadoes, but demolished several buildings and killed eight people in Nebraska.

*Yutan Tornado.* This started at the ground level two miles east of Ithaca, Nebraska, at 5:30 p. m. We traced its continuous path of destruction over seventy miles. The width was one-fourth to one-half mile and evidenced extreme energy. Fortunately this storm narrowly missed several villages. It destroyed ninety-three sets of farm buildings and killed nineteen people in Nebraska. The greatest damage was in Yutan where fifteen persons lost their lives. Here about half of the town was demolished, yet so few were killed. A trunk was carried from Yutan to Iowa; likewise a vest and watch. A young woman, carried a quarter of a mile in the debris of a house, was uninjured. Just what destruction was wrought in Iowa is not known.

*Omaha Tornado.* Starting near Kramer, nearly sixty-five miles southwest of Omaha, this member of the series did not make a continuous path. It swept the ground for eight miles in the vicinity of Kramer, then rose in its course just south of Lincoln, but did some damage at College View and University Place. It formed a path beginning east of Prairie Home and extending to the Platte River. Near Kramer and southeast of Greenwood rural improvements were demolished, yet no people were killed. At the Platte the tornado lifted for a few miles. It reached the ground three

miles west of Papillion and moved across Ralston, Omaha and into Iowa. The Kramer, Greenwood, and Omaha tracks were made by one continuous storm, starting a few minutes before 5 p. m. and crossing the Missouri at 6 p. m. Persons in the country saw the clouds pass between the three well defined paths. Then too, the tornadoes had the direction and sequence in time that would suggest their relation.

This tornado destroyed about 27 groups of farm buildings in Nebraska and, in Ralston and Omaha, caused damage amounting to hundreds of thousands of dollars with a death list of one hundred people. It was not so violent as the Berlin or Yutan tornadoes and certainly did not show the energy and force exhibited in some other historic tornadoes. The three paths in Nebraska had a length of thirty-one miles, whereas the storm moved much farther than that in this state and Iowa. In Omaha a great many observations were made noting tornado phenomena. Numerous objects were collected for engineering tests at the University of Nebraska. These included pieces of trees, lumber, etc., that had been penetrated by other objects.

Immediately following the tornado, the city of Omaha and the districts affected by the other tornadoes were canvassed by insurance men and the tornado insurance written in a few weeks amounted to several millions of dollars. As a further means of protection many people also built storm cellars or caves.

*Manawa Tornado.* At 6:15 p. m., ten miles south of the Omaha tornado, the Manawa tornado was formed just north of Bellevue and moved northeastward nearly parallel with the other storms. It did practically no damage west of the Missouri River but was violent in Iowa.

*Berlin Tornado.* This, the most southerly of the series, developed at 5:55 p. m., about forty miles south and thirty miles west of the point where the Manawa tornado started. It was twenty minutes before the latter storm began, but at a point about forty-one miles from the Missouri River. The record shows that it did not reach Iowa until twenty-one minutes after the Manawa storm. The continuous path of destruction in Iowa-Nebraska was fully eighty miles long. Fifty-two groups of farm buildings were demolished in Nebraska and thirteen people were killed. Five persons were killed in Iowa.

The path of the Berlin Tornado was studied with great care. For the first eight miles it was weak. Here limbs were broken

from trees and buildings moved from foundations and damaged in a way that indicated a tornado. Farther on the path was practically continuous. Whatever was in the center was destroyed and near the edges was more or less damaged. The ground showed the effects of the severe wind. It had the appearance of being scoured much as if a swift stream of water had passed over it. The grass, cornstalks, and stubble, were left as if swept in a mighty tide in the direction in which the wind blew. The wire of fences was loaded with debris like that which floats in a water course at flood time, and in the center of the path fences were carried away, posts and all. The path averaged between one-fourth and one-half mile in width.

In the right zone of the storm path, objects were carried forward and inward, and in the left zone they were carried backward and inward. Some objects made complete circles in the storm. On the right, houses were lifted, moved northeastward, the northeast corners or sides striking the ground, as shown by marks in the soil. Then the houses were turned over, the wind entering through the bottom or places broken by the strain, and were crashed or blown to pieces and strewn over fields to the northeastward. Houses and barns on the left of the center moved into the storm from the opposite direction. This fact, that on the left of the center, some of the houses were pulled backward and inward, while on the right they were thrown forward and inward, caused many people to think that two storms had met, traveling in opposite directions. The fact that some buildings were thrown to the north and some to the south seemed to support this conclusion, but it is readily explained by the circular twisting motion of the tornado. It was observed that most of the destruction occurred on the east side of the center of the storm and that most of the debris was carried to the north and toward the center.

Evidence was sought of the explosive action so frequently given as a cause of house destruction by tornadoes. In a few cases the sides or parts of buildings seem to have fallen outward on account of a sudden decrease in pressure on the outside, but this evidence was not common. The debris of the houses was moved after the crashing and expansion had wrecked them, but inspection shows that crushing was the more important factor. Houses on the outer borders of the storm paths were damaged but usually not destroyed. They were partly turned or pulled from their foundations in the direction of the whirl with damage to the less resistant parts, such as porches, roofs, windows and chimneys.

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There was strong suction, with upward currents in the storm. Doors were pulled outward from the grasp of persons in cellars and caves. Large animals including farm animals and people were lifted and carried considerable distances. The damage done by this tornado included the total destruction of 52 groups of farm equipment. Large buildings were completely torn to pieces, barns demolished, huge beams shattered, and stone fences scattered. On one farm 2,500 bushels of shelled corn absolutely disappeared and a crib with 4,000 bushels of unshelled corn was picked up and moved bodily. On the Sheldon farm, southeast of Nehawka, the damage to property amounted to $25,000. The house was torn down, three big barns and sheds, outbuildings, and fences were swept away; twenty-nine cattle, fifty-four hogs, one horse, and one person were killed. Chickens fared worst; hogs, cattle, and horses not so badly.

With the great destruction of property it is remarkable that only thirteen persons were killed in the Berlin Tornado. However, people caught in the open were usually injured or killed. Deaths were caused by people being blown against objects or being struck with flying debris. Of those killed all were in Berlin except three in the country who had not reached the protection of caves and cellars. Persons situated so that they could see and hear the approach of the storm and who hastened to cellar or cave usually escaped. Nearly all loss of human life was on the northeast slopes without outlook to the southwest. The cellar proved a safe place even when the house was blown away, the southwest corner being the safest position. On the smooth, open country the tornadoes were seen and heard quite a distance and the people probably had from two to four minutes notice of their approach, or time to reach places of safety. People in valleys or on north or northeast slopes taken without warning had less than thirty seconds, for the storm traversed a given point in that time.

We found that the testimony of those who were in the storm was not always reliable, for they received mistaken impressions and honestly reported what did not happen. One man sitting in his kitchen at Berlin felt sure that his house was lifted and whirled around many times. As a matter of fact, the house was largely wrecked but the kitchen was least damaged. On going out after the storm the owner could hardly believe his eyes, for he saw that the kitchen had not left its foundation. The house was near the center of the path. The impression was undoubtedly received from

observing the circular motion of moving articles outside through the window. From the great mass of testimony of eye witnesses and from our own survey and investigation the following very general conclusions may be drawn with respect to these great disasters:

1. The storms developed in the late afternoon during the time of highest temperature, which is the rule for the occurrence of severe thunderstorms and tornadoes in this part of the Mississippi valley. This made their approach noticeable and lessened the loss of life.

2. The tornadoes moved northeastward, sweeping the ground continuously for unusually long distances, forming well marked paths. Their movement was faster than that reported for most tornadoes.

3. In the vortex of at least three storms a velocity of 200 to 400 miles an hour was reached. This was determined by engineering tests of materials that had penetrated other objects. The velocity was so great as to cause soft objects to penetrate hard ones.

4. There was the least loss of life among occupants of buildings on high points with southwest exposure and the greatest loss among those on northeast slopes without outlook to the southwest.

5. Only two persons in the country and small towns were killed in a cellar or cave, in which case the house crashed upon the roof of an old cave.

6. The safety of the cellar or cave seems to be due to the fact that the people therein are below the flying debris which moves with such great velocity and force.

7. The explosive effect on buildings was much less than is usually supposed, the destruction resulting mostly from crashing of buildings against the ground or against trees and other buildings.

8. As a result of these storms, tornado insurance increased in popularity and many people in both city and country are now constructing storm caves.

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# A NOTE ON THE CLASSIFICATION OF CLIMATES*

By ROBERT DeC. WARD
Harvard University

In the great variety of the world's climates it is essential that we have some classification, some grouping of like with like, some scheme of systematic correlation, which shall bring order out of chaos, and shall enable us to study and to describe climates in a rational and simple way. When, for example, we read the accounts of the war in the Balkans, or of the approaching opening of the Panama Canal, or of the sufferings of the wretched rubber collectors in the remote forests of the Amazon, the climatic environment in each of these cases has an immediate and live interest. We ought to be able to picture to ourselves the essential characteristics of that environment. More than that, we ought to be able to correlate the climatic environment in these three regions with other similar climates, in other parts of the world. Geographers in general, and those who have had the task of teaching climatology in particular, fully realize the great need, in their daily work and study, of a reasonably simple, rational and practical scheme of climatic classification, of a series of climatic "pigeon-holes," as it were, into which they can fit each climatic type with which they have to deal.

This subject is, in reality, a very vital one. It has, naturally enough, received much attention, from early times. On the one hand we have the various classifications of the zones, in which there are certain broad belts, divided by more or less east-and-west lines. On the other hand, when these zones have been subdivided to a considerable extent, we have our classifications of climates, our climatic provinces or regions. The dividing line between these two sets of classifications is impossible to fix. The zones of climate gradually merge into the climatic provinces. Under the zonal groupings we have the classic subdivision of the earth's surface on the basis of the distribution of sunshine, which dates back to the time of the early Greek philosophers, and which has given us our familiar five-zone division, so simple, so long used, so well known, and, in spite

*Cf. also, by the same author, "The Climatic Zones and Their Subdivisions" and "The Classification of Climates," in this *Bulletin*, Vol. 37, 1905, pp. 385-396, and Vol. 38, 1906, pp. 401-412, 465-477, respectively (Chapters I, II and III of the author's subsequent book "Climate, Considered Especially in Relation to Man," 1908, reviewed in the *Bulletin*, Vol. 40, 1908, p. 490). Ed.

of its not according well with the facts of climate, still on the whole so satisfactory to the vast majority of people. The fact that these astronomical zones—i. e., the zones of sunshine—differ a good deal from the zones of heat, naturally led to the limitation of the climatic zones by isotherms rather than by parallels of latitude. Thus Supan[1] gave us his temperature zones, in which the mean annual isotherm of 68° and the isotherm of 50° for the warmest month are taken as rational boundaries, replacing an earlier and more complicated scheme[2], by the same authority, in which some less critical temperatures had been selected as limiting lines. Another classification of temperature zones was suggested by Köppen,[3] in which the length of time during which the temperature remains within certain fixed limits is taken into account, these limits having well-marked relations to the life of plants. Two critical (daily mean) temperatures, 68° and 50°, and the duration of these temperatures for periods of 1, 4 and 12 months, are the factors in this scheme, the temperatures not being reduced to sea-level. While this method of classification is rational in emphasizing the very important element of temperature, and the scheme is particularly useful in special studies of plant distribution, it is rather too detailed for general adoption. The grouping of the climatic zones according to the systems of the prevailing winds, as suggested by W. M. Davis,[4] has much to recommend it from a meteorological standpoint, for the great wind belts are associated with the great rain and cloud belts, and have their own distinctive climatic characteristics. But the classification by wind systems involves a shifting of the boundaries of the zones with the seasons which, while logical and natural, nevertheless does involve a good deal of confusion. Woeikof's compromise suggestion,[5] between the limits set by latitude lines in the Greek scheme and those set by the winds, loses some of the advantages of each of these schemes, and gains but little in return.

While a broad division of the earth's surface into zones is necessary as a first step in any systematic study of climates, as soon as a more detailed discussion is undertaken there comes an inevitable need of a more detailed climatic subdivision. Thus, we have the familiar grouping into continental and marine climates, with the

[1] A. Supan: Grundzüge der physischen Erdkunde, 5th edit., 1911, pp. 98-100 and Pl. VIII (originally published in 1896).

[2] *idem:* Die Temperaturzonen der Erde, *Petermanns Mitt.*, Vol. 25, 1879, pp. 349-358 and Pl. 18.

[3] W. Köppen: Die Wärmezonen der Erde., etc., *Meteorol. Zeitschr.*, Vol. I, 1884, pp. 215-226.

[4] W. M. Davis: Elementary Meteorology, 1894, pp. 334-335.

[5] A. Woeikof: Die Klimate der Erde, 1887, Part I, p. 327.

modifications in desert, littoral, monsoon, and mountain and plateau types. It is obvious that an almost infinite number of classifications of climates might be proposed, for we may take as the basis of subdivision either the special conditions of one climatic element, or similar combinations of two or more elements. Some of the suggested classifications are well known; others are practically unknown. In Supan's scheme[6] there are 35 climatic "provinces." Each is numbered and named, and its essential characteristics are briefly described. But there is no correlation between similar climates in different parts of the world, although, as is well known, many of the larger types recur on the several continents in fairly systematic fashion. Thus, in Supan's scheme, the characteristics of each province must be learned for and by themselves, although every careful student will himself recognize the points of resemblance in many cases, and will naturally come to associate provinces which have different numbers and different names together. Köppen[7] proposed an interesting classification of climates which depends upon certain values of the temperature and rainfall of the warmest and coldest month, or of the wettest and driest month, thus combining the two elements of precipitation and temperature. Five principal groups of plants constitute the major divisions, and these are subdivided until the whole number of "climates" reaches 24. The special conditions which characterize each of these climates are carefully determined, and each sub-climate is given a distinctive name. This elaborate scheme is too complicated for ordinary use, but it is of great value to students of plant geography. Then we have Penck's suggestion[8] for subdividing climates, not on a rigid meteorological basis, in which accurate observations are necessary, but according to certain large and readily recognizable features of surface form, of glaciation, and of the relation of evaporation and rainfall—a sort of "car window" classification of climates, both simple and useful; and de Martonne's new climatic provinces[9] and Hult's little-known and elaborate scheme[10] which includes more than 100 small provinces; and Ravenstein's "hygro-

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[6] A. Supan: Grundzüge der physischen Erdkunde, 5th edit., 1911, pp. 230–234 and Pl. XV (first published in 1903).

[7] W. Köppen: Versuch einer Klassifikation der Klimate, vorzugweise nach ihren Beziehungen zur Pflanzenwelt, *Geogr. Zeitschr.*, Vol. 6, 1900, pp. 593–611 and 657–679, with Pls. 6 and 7.

[8] A. Penck: Versuch einer Klimaklassifikation auf physiogeographischer Grundlage *Sitzungsberichte der Preussischen Akad. der Wiss.*, 1910, Vol. XII, pp. 236–246.

[9] E. de Martonne: Traite de Géographie Physique, 2nd edit., 1913, Chapter VI of Section 2, with Carte des Climats (unaltered from first edition).

[10] R. Hult: Jorden's Klimatområden, *Vetenskap. Meddelanden af Geogr. Föreningen i Finland*, Vol. I, 1892–93, pp. 140–201, with Pl. XVI.

thermal types,"[11] suggestive, but resting upon incomplete and unsatisfactory data. We ought also to make mention of the numerous classifications of rainfall types and seasons, such as that of Köppen, for instance.

It is obvious that, as noted above, there is really no limit to the number of such classifications, for there is no limit to the number of combinations of the various climatic elements which may be taken as the basis for the subdivisions. Some will prefer one scheme. Others will prefer another. There is, and there can be, no general agreement as to *the best*. Indeed, the whole matter is a difficult one. The fact that several of the authors who have given us carefully considered schemes have themselves changed their own maps is a pretty good indication that a fixed and satisfied state of mind is difficult to attain.

Among those who have given much careful attention to this subject of late years is Professor A. J. Herbertson, of the School of Geography, University of Oxford. In 1905 Dr. Herbertson[12] published his first map of so-called "Major Natural Regions," the basis of this classification being, not a certain definite value of a single climatic element, or of a fixed combination of two or more elements, but a certain unity of temperature, rainfall seasons, configuration and vegetation. The original scheme was somewhat revised in 1907,[13] and, if we are not mistaken, has been again slightly revised for the Oxford Wall Maps series.* The different types of natural regions recur in fairly systematic order on the different continents, being chiefly controlled by marine and continental influences, and each type, wherever found, has certain similar general relations to human life and development. This scheme, therefore, in which a particular type of natural region has the same number, wherever it is found, is especially helpful in all studies of world climatology, as well as in investigations of the economic and political history of mankind. The chief characteristics of each type having been learned, and the geographic distribution of the types being known, the grouping of the natural regions, while not exactly a classification of climates, is one of the best working schemes for a systematic study of climatology. The present writer can testify to the great value of this classification because of its rational, simple and effec-

[11] E. G. Ravenstein: The Geographic Distribution of Relative Humidity, *Report Brit. Assoc. Adv. Sci.*, 1900, pp. 817–818.

[12] A. J. Herbertson: The Major Natural Regions: An Essay in Systematic Geography, *Geogr. Journ.*, Vol. 25, 1905, pp. 300–312 (map on p. 308).

[13] The Senior Geography, Oxford, 1907, frontispiece.

* See, under "World," *Bulletin*, Vol. 45, 1913, p. 640. Ed.

tive correlation of climates and conditions of life. He has found it the best working scheme of all that have thus far been suggested.

In investigating the essential qualities of his different natural regions—the climatic characteristics which give them their distinctive effects—Dr. Herbertson has been making a special study of temperature conditions. The various steps which have been taken in this work, leading eventually to the construction of a new map of thermal regions, are briefly described in a recent paper on "The Thermal Regions of the Globe,"[14] this being the abstract of a paper presented at a meeting of the Research Department, Dec. 14, 1911. In all of his studies, Dr. Herbertson has been endeavoring to find out what are the best methods of representing the thermal conditions of the earth's surface for the use of geographers. It is no exaggeration to say that few investigators have extracted so many important facts from the ordinary isothermal charts.

In the course of his studies, Dr. Herbertson has constructed several different isothermal maps.† Beginning with the mean annual temperatures reduced to sea-level, and realizing that the ordinary isothermal map, with its many lines, is very confusing, a choice was made of three critical lines, those of 32°, 50° and 68° Fahr., and a mean annual temperature map was prepared with these isotherms drawn upon it. The selection of these particular isotherms is justified on several grounds, and we cannot help feeling that if teachers generally, in using the mean annual isothermal map in their classes, would emphasize the location of these particular isotherms (70° may be taken in place of 68° and 30° in place of 32°, if these are not on the chart in use), perhaps having them drawn in in heavier lines, their students would gain a clearer idea of the essentials of the map. Yet, as everyone knows, mean annual temperatures are unsatisfactory, indeed often misleading, for they do not give any clue to the seasonal variations Recognizing this fact, Supan, as above noted, in his map of temperature belts, used, in addition to the mean annual isotherm of 68° the isotherm of 50° for the warmest month, thus giving a very simple but rational series of temperature zones. Dr. Herbertson, going a step further, has published a map showing the thermal zones obtained by using the isotherms of 32°, 50° and 68° for the warmest and coldest months, and indicating these different zones by different styles of shading. This map (Fig. 3 of Dr. Herbertson) is made by superposing the Janu-

[14] *Geogr. Journ.*, Vol. 40, 1912, pp. 518–532.

† Reviewed under "World" in the *Bulletin*, Vol. 45, 1913, p. 80. Ed.

ary and July maps showing the 32°, 50° and 68° sea-level isotherms, a construction which we have ourselves used effectively in laboratory work in climatological instruction. Many of the most important facts as to range of temperature are clearly brought out by this method, and the student furthermore gains a clear idea of the seasonal migration of isotherms, and of the progress of the seasons. A further step, along the same lines, has been taken by Dr. Herbertson in the construction of a "thermal zone" map based upon the seasonal isotherms of 32°, 50° and 68°. This chart is not reproduced in the paper under discussion.

The maps just referred to concern sea-level temperatures. All meteorologists recognize the importance of sea-level isothermal maps in showing the large facts of temperature distribution; the effects of continents and oceans; of ocean currents and of winds; and appreciate the difficulty and uncertainty of constructing isothermal charts showing actual temperatures, not reduced to sea-level. Yet no serious student of geography can have failed to realize that sea-level isotherms are often most unsatisfactory, insufficient and misleading. One who has gained his knowledge of the climate of some moderately elevated region from sea-level isothermal maps alone, without allowing for the altitude, will, on actually visiting that locality, often experience a curious sensation of surprise and of disappointment, when he finds that his preconceived notions as to the temperature are quite erroneous. Thus it has come about that there has been a marked tendency of late years to chart actual air temperatures. Dr. Herbertson has made a valuable contribution to our existing series of isothermal charts by drawing the actual January and July isotherms of 32°, 50° and 68°, whose positions he determined (using contoured maps and allowing for the altitudes) with great care. The land areas are distinctively colored, and, for purposes of comparison, the sea-level isotherms of these same values have been included (Figs. 4 and 5). This method of showing actual rather than sea-level temperatures brings out several points of much importance. For example, the sea-level isotherm of 32° in January crosses North America from south of Vancouver Island to south of the Great Lakes, yet some of the sections with an actual temperature below freezing extend as far south as the sea-level temperature of 50°. Again, in Asia, the 32° line of actual temperature comes much farther south in Tibet than does the sea-level isotherm of 50°. In July, on the other hand, the actual isotherms show that Tibet has a relatively low temperature, a condition quite

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different from that indicated on the ordinary sea-level isothermal chart. By superposing the January and July maps Dr. Herbertson was able to construct his chart of Thermal Regions (Fig. 7) which, together with the two monthly maps, has been reproduced, in colors, in the series of Oxford Wall Maps (60x40 inches). This wall-map we have found extremely useful in class-room work. A comparison, in the laboratory, between the sea-level and the actual temperatures is always an interesting and instructive exercise. Several striking facts at once impress themselves upon the mind. The relatively cool area over the East African plateau, within the "hot belt," and the extension of the area of "warm summers, cold winters" from northern Eurasia down into Tibet, are two of the most notable features. This map of thermal regions, then, comes much nearer the facts of existing climates than do any of the sea-level isothermal maps. Teachers of geography who want to present the real facts, rather than the somewhat ideal picture, will find it extremely useful.

In his endeavor to give still more information about the actual temperature conditions, "without undue complexity," Dr. Herbertson next proceeded to construct thermal maps to show the number of months with temperatures above 68°, above 50° and below 32°. The general idea, therefore, is not wholly unlike that embodied in Köppen's chart of temperature zones above referred to. From the available standard temperature-tables new tables were prepared giving the number of months with temperature over 68°, over 50° and under 32°. The numbers were then entered on large-scale maps, and the height of each station was noted on another set of maps. These maps were on tracing paper, to permit superposition. Next the line was drawn separating regions where at least one month has a mean temperature of 50° and those where no month has such a temperature; and so on. Where mountainous countries were being dealt with, valleys and plateaus, not the highest parts of the ranges, were considered. Figure 7 of the paper under discussion shows the results, the land areas being shaded to indicate the different numbers of months (1, 3, 5, 7, 9, 11) with temperatures over 50°. Dr. Herbertson points out that the line between three and four months over 50° is important, because it indicates roughly the northern limit of profitable wheat-growing, at least in eastern North America. Another map, showing the number of months over 68°, and one showing the number of months under 32°, were also prepared, and from these three a new map of Thermal Regions (Fig. 8)

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was constructed, which is perhaps the most complete representation of the actual temperature conditions of the world on a single map hitherto published. There are in all fifteen different regions (one embracing all lands over 4,000 meters in altitude), which differ from one another in the numbers of months with temperatures over or under 32°, 50° and 68°. In spite of the number of regions, the map is singularly clear and distinct. It is difficult to imagine how mean monthly temperatures could be more clearly and effectively shown on one map than is here the case. The region where no month has over 50° coincides roughly with the tundra. An important region is the one with at least four months over 50°, and with four or five months below 32°. In passing from the continental interiors westward the number of months over 50° does not change, but there is a decrease in the number of months with frost. While central Europe has less than four months of frost, western Europe has no month with a mean temperature under 32°. There is nothing in eastern Asia corresponding with the British Isles, France and the Low Countries of Europe, but we find that same milder northwestern European region in western North America, in southern South America, in Tasmania and in New Zealand. In North America the zone with from one to three frosty months but with at least three months over 50° marks roughly the northern limit of corn cultivation. In Africa the altitude gives areas within the great hot belt which, Dr. Herbertson says, "are distinctly more temperate than any other part of this belt except in the Andes." There are many other points of interest which might be referred to.

In considering Dr. Herbertson's new map of thermal regions, it seems to us that both in his selection of the critical monthly temperatures, and in his working out of the thermal regions, our author has shown excellent judgment. It must be obvious to everyone that the duration of these critical temperatures is of great importance in the distribution of vegetation and of crops. We feel sure that physicians and many others who have a peculiar interest in temperature will find the map most useful, and that teachers of geography will be able to bring out many important facts by their use of it in their classes. For a quick determination of the essential temperature conditions of any region, the new map is admirably adapted. There are, of course, several points which may be urged on the other side. There are manifest difficulties, which our author recognizes, in constructing the map in regions where there are great differences of altitude, and it would, per-

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haps, seem wiser not to attempt to introduce quite so much detail in a map which cannot, for ordinary use, be on a very large scale. Botanists will probably say that they have more interest in extremes of temperature, and in the seasonal rise and fall, or in the diurnal variability, than in the monthly means. Other persons will say that the temperatures without the rainfall mean little. Others, again, will ask for data regarding cloudiness, or evaporation. But, as we have said, these maps are maps of thermal regions, and they lay no claim to being anything else. And, moreover, we understand that Dr. Herbertson's object in constructing them was primarily in order that there might be discussion of the different methods by which the temperature conditions may best be represented for the use of geographers. For our own part, we feel under great obligations to Dr. Herbertson for his painstaking work on these numerous temperature charts, and especially for his emphasis upon the importance of the actual as contrasted with the sea-level temperatures. Those who have spent most of their lives in becoming familiar with sea-level isotherms will have a wholly new and a far more rational view of the world's temperatures as the result of their familiarity with Dr. Herbertson's work. The more widely his charts are known and used, the clearer and the more accurate will be our meteorological knowledge. It is a fortunate circumstance that the January and July actual temperatures, and the thermal regions map based upon them, are already available in the excellent series of Oxford Wall Maps. We hope that the new thermal region map, based upon the numbers of months above and below certain temperatures, will soon be added to the Oxford Series.

We sincerely hope that Dr. Herbertson will continue his interesting studies, and will, before long, be able to give us, in brief numerical form, the essential climatic characteristics of his Major Natural Regions. With that addition we believe that his scheme of subdivision of the earth's surface into "natural regions" will meet the needs of most geographers who are in search of a rational, simple, "working" classification of climates.

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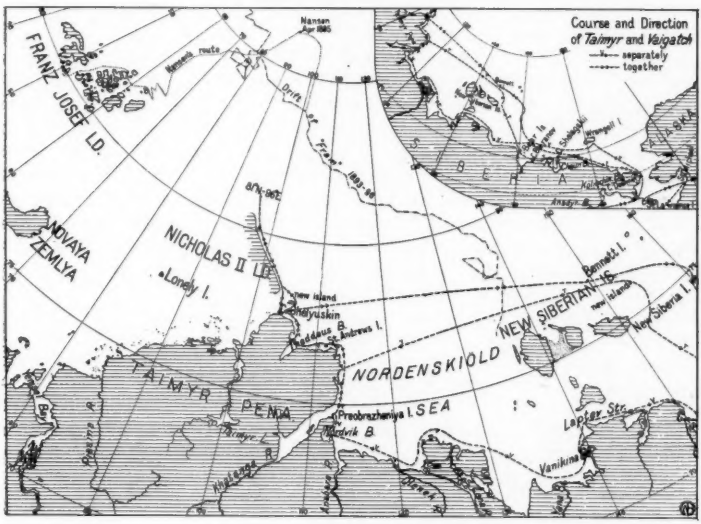
# NICHOLAS II LAND*

Brief reference has been made in *The Times* to the discovery by the Russian Hydrographical Expedition of a large island in the Arctic Ocean. Captain B. A. Vilkitsky, the leader, has sent the Admiralty an extract of the log, of which a translation is given below. It will be seen from it and from the accompanying map that some highly interesting oceanographical and other problems have been suggested or solved by the discovery.




Sketch Map of the Arctic Ocean North of Siberia Showing the Newly Discovered Nicholas II Land. Scale, 1:22,700,000. On both the main map and the inset the routes of the *Taimyr* and *Vaigatch* are shown by broken lines, double arrowheads being used to show their direction when sailing together, single arrowheads, with the initial of the respective vessel, when sailing separately. On the main map the drift of the *Fram* and Nansen's sledge journey are also shown for comparison.

An explanation is furnished thereby of the northerly curve described by the drift of the *Fram* during the Nansen Expedition of 1895-96. Judging by the distance that separates the northern limit of the explored coast and the *Fram's* drift, it is not impossible that the new Emperor Nicholas II Land may extend beyond the 200 nautical miles explored by Captain Vilkitsky, and prove to be the nearest land to the Pole.

How far it may extend westward remains a matter for conjecture. We have no records of exploration in the waters to the east of Lonely Island. But the

* Reprinted from *The Times*, Russian Supplement, No. 6, London, Dec. 15, 1913, supplemented by Gen. Schokalsky's account in the *Geogr. Journ.* for January (Vol. 43, 1914, pp. 64-65).



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presence of the land discovered by Captain Vilkitsky is sufficient to account for certain peculiarities of the Kara Sea. The conditions of the ice and of the currents and the salinity of the water in this sea have long suggested the theory that some very substantial obstacle stood between it and the Arctic Ocean. In 1882 Lieutenant Hovgaard, of the Danish Navy, actually sailed for Cape Chelyuskin to discover land to the north of the cape. He was, however, unable to reach the Taimyr Peninsula. The three expeditions that have successfully weathered Cape Chelyuskin—Professor Nordenskjöld in the *Vega* in 1878, Professor Nansen in the *Fram* in 1895, and Baron Toll in the *Zaria* in 1900—all failed to note even the appearance of land to the north, although, as Captain Vilkitsky now shows, an island lies not more than 20 miles away from the course steered by the expeditions.

And now a few words about the character and purpose of the Vilkitsky expedition. Some four years ago the Russian Government built and commissioned two small ice-breakers, the *Taimyr* and the *Vaigatch*, to proceed to the Far East, and thence, after surveying the northern waters, to go westward to the Murman coast. The idea was to settle the vexed question raised by the war with Japan as to the practicability of the northern passage for warships. Captain Vilkitsky, undaunted by the presence of unbroken ice off Cape Chelyuskin, which had caused his predecessor last year to recoil, tried to make the westward passage by skirting the barrier, and thanks to his pluck and persistence he was rewarded by the present discovery, adding one more to the long list of Russian exploits in the Far North.

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### Log of the Expedition

Having coaled and taken water from the *Argun* in Anadyr Bay I put to sea on August 4. On the night of August 6 we touched at Cape Deshnef (East Cape) and repainted the cross there. The transport *Vaigatch* laid her course towards Wrangell Island in order to ascertain the condition of the ice, while the *Taimyr* steamed along shore. During the cruise we took international meteorological observations. On the following day the vessels were among scattered ice and met the Norwegian steamer *Kit* walrus hunting. We lent her a chronometer and gave the crew some fresh fish. Along the meridian of Wrangell Island the ice was gathering. I received a wireless message from the *Stavropol*, which had been caught in the ice, and from the *Vaigatch*, which had failed to make Wrangell Island by five to ten miles because of the ice.

On August 9 the *Taimyr* forced her way to clear water and was off Cape Shelagskii. While awaiting the arrival of the *Vaigatch* we sounded Chaun Bay. On August 12 the *Vaigatch*, having made the meridian of Chaun Bay, met the *Stavropol* there and transferred the Kolyma-bound mail to her. The *Taimyr* was three days forcing her way through the ice until she was off Cape Baranov.

On August 15 we reached clear water. Having passed the Bear Islands we rejoined the *Vaigatch* and proceeded further—the *Taimyr* on a hydrological survey around the New Siberia Islands, the *Vaigatch* to complete our soundings along the coast. The rendezvous was at Transfiguration (Preobrazheniya) Island. On August 17, while skirting the broken ice thirty miles off the New Siberian coast, we came into shallow water.

*Discovery of an Island.* It was August 20 before we succeeded in finding a way northeast to the open sea. We then discovered a new island of volcanic

origin several miles in circumference. We raised the national flag, surveyed the island, killed some white bears and walruses, and went on. On August 21, while taking the great circle course towards Taimyr, we came off Bennett Island; on August 23 we reached the mainland in lat. 76°. There had been clear water all these days and a clear horizon, but we had seen nothing of the conjectured Sannikov Land. We turned south and joined the *Vaigatch* at Transfiguration Island that evening. We landed a shooting party which killed two reindeer and some bears. The *Vaigatch* had completed the soundings in Laptev Strait on August 17, keeping as far possible south of thirty-five-feet depths. On August 18 she had reconnoitred Vanikina Bay, the entrance proving unsatisfactory. On August 21 she began the survey of the mouths of the Olenek and Anabara, but contrary ice compelled her to stand away from the coast. On August 22 the *Vaigatch* entered Nordvik, sounding the southern coast of Begitchev, where sharply-varying depths were found. Coming to shallows boat soundings were taken, but the water shoaled suddenly and the vessel touched a sandbank. On August 23 she floated off with the tide, surveyed the eastern coast of Begitchev and arrived at Preobrazheniya Island.

On the morning of August 24 the *Taimyr*, after adjusting her compasses, steamed northward for coast survey. The *Vaigatch* proceeded to explore a large bay in latitude 75° 50′ N. On August 25 she grounded on a shoal fifteen miles up the bay and could not get off till the *Taimyr* came to her assistance, on August 26, after completing her survey as far as latitude 76°30′ N. During the night the *Taimyr* took water from her consort and towed her off with the tide. We found cooking stoves at the entrance of the bay and further in, probably built by Khariton Laptev. The *Taimyr* continued coast survey work, while the *Vaigatch* took an astronomical observation and surveyed the islands. The observation was made on St. Andrew and St. Samuels Island. Thence onward we began to encounter ice.

On August 30 and 31 the *Taimyr* sounded in Thaddeus Bay to twenty-foot depths. The *Vaigatch* continued her coast and island survey. The ice was gathering. On September 1 we completed the survey of Cape Chelyuskin by taking cross bearings at a distance of six miles off shore. Both transports were stopped by solid ice and tried to skirt it.

*The New Land.* Thirty nautical miles northeast of Cape Chelyuskin the expedition discovered an island which was free of ice to the east. This island extends along the parallel, and its width at the eastern extremity is seven miles. After surveying the accessible part of the shore, the expedition skirted the edge of compact ice, encountering separate icebergs and broken ice. At daybreak on September 3, thirty nautical miles from the eastern point of the newly discovered island, we sighted the towering heights of an unknown land; seven miles off shore we sounded depths of 700 ft. The *Taimyr* proceeded to survey, while the *Vaigatch* stood off trying to get an observation.

The land proved to be of volcanic origin, containing extensive glaciers. On September 4 we landed at lat. 80°4′ N., long. 97°12′ E. I raised the Russian flag and declared the land annexed to his Imperial Majesty's dominions.

The evening of that day we raised anchor and went further north seeking a passage. The broken ice began to gather. On our way we surveyed the northeast shore of the new land for a distance of 20 miles. On the morning of September 5, in lat. 81° N., long. 96° E., we found unbroken ice on all sides. The soundings showed 116 ft. to 700 ft. We put back. On September 6 the

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expedition returned to Cape Chelyuskin. The ice had not changed. On the next day we again went to the newly-discovered island. Ice was sweeping in from the east. The barometer was rising fast. On September 10 the *Taimyr* once more returned to Cape Chelyuskin. The east wind had broken up the ice somewhat, so I sent a land party under Dr. Starokadomsky and Lieut. Lavrov over the ice to discover how wide the ice barrier was. On September 11 the *Vaigatch* rejoined us, for the ice was beginning to block the island. We drilled the ice [at Chelyuskin] and found it to be three to four feet thick. The party reached the shore at the spot where the *Zaria* expedition mark stands, and after putting up a mark on Cape Chelyuskin itself went further on. The end of the icefield was not to be seen, but its width was at least forty miles.

*The Voyage Continued.* On September 11 the land party returned to the ship. We attempted to break our way through the ice, but succeeded in making only five miles in twenty-four hours. Our diminishing coal supply, the necessity of cleaning out our boilers, and the lateness of the season compelled me to put back to Vladivostok. While anchored off Cape Chelyuskin we killed a few more bears. On September 12 we headed [for the east] by the great circle route. For three days we encountered separate fields of ice and skirted them to southward. On September 18 we were off Bennett Island. I then learned that the *Taimyr's* condenser pipe had burst, and salt was filtering into the boilers, as their usual cleaning-time was overdue. Strong south winds prevailed.

Taking shelter under the northern shore of the island I sent a land party headed by Dr. Starokadomsky to look for the collection left by Baron Toll. They erected a cross on Cape Emmelina, in memory of Toll and his followers. The collections, weighing seven pouds (252 lbs.) were found; they included fossils, impressions of plants, and a mammoth tusk.

†[On September 22 the wind became lighter, and the expedition surveyed the island and started south. It was intended to take the great circle route to Wrangell Island, but the heavy ice obliged the expedition to go by zigzags about 300 miles along the meridian of 160° E. Sometimes the ships met new ice, and it was very difficult to pick their way during the darkness of the nights. On September 25 they came to open water and immediately trawled for zoological purposes.

The next day the expedition met the ice up to the meridian of Chaun Bay, but the water was open from 70° N. and 180° E. On September 29 the ships reached Koliuchin Bay and surveyed it. They started on October 3, but a heavy gale compelled them to anchor; the route was then continued to Cape Deshnef. On the 22nd the cape was passed, but 40 miles from Providence Bay a heavy storm caught the ships, which rolled about 55° and the speed against the wind was not more than half a knot. In the night the tiller-rope of the *Taimyr* broke, and only the next night could the ships approach the shores of St. Lawrence Island. On October 9 the expedition was at St. Michael, Alaska, and on October 27 at Petropavlovsk in Kamchatka, from which this report was sent by wireless.]

The expedition has made extensive botanical, geological, and zoological collections. During the entire cruise we made soundings and conducted meteorological and hydrological observations. As far as possible, at interesting points, we maintained hydrological stations, and at astronomical points we determined the magnetic declination.

† These two paragraphs are taken from the *Geogr. Journ.* for Jan., 1914.

# THE CONFERENCE ON GEOGRAPHICAL EDUCATION HELD DURING THE TRANSCONTINENTAL EXCURSION OF 1912

Toward the end of the Transcontinental Excursion of the American Geographical Society, on October 12, 1912, a conference on geographical education was held on the initiative of Professor W. M. Davis at the University of Virginia in Charlottesville. This was a fitting corollary to the other activities of the excursion, for the majority of its members were educators and the advancement of geography through personal contact between European and American geographers was one of its main objects. Five European geographers made addresses on the teaching of geography in the universities of their respective countries; two American geographers were to make similar addresses on the status of geographical education in this country, but were prevented by lack of time. The European geographers who spoke were: Professor Joseph Partsch of the University of Leipzig; Professor Lucien Gallois of the University of Paris; Professor Eugen Oberhummer of the University of Vienna; Professor George G. Chisholm of the University of Edinburgh; and Professor Emile Chaix of the University of Geneva. The two American geographers who were unable to speak were: Professor Albert P. Brigham of Colgate University, and Professor Mark Jefferson of the State Normal College at Ypsilanti, Michigan. All seven addresses have recently been made accessible in the *Proceedings of the Philosophical Society of the University of Virginia*, 1911-1912, pp. 99-134.

Before introducing the speakers Professor Davis made a few remarks in which he pointed out that the standard of a subject in elementary and secondary schools is dependent on the status of that subject in the higher institutions of learning; hence the necessity of developing geography as a university subject in this country if we wish to improve its condition in the schools.

Professor Partsch in his address referred to the fact—which is not familiar to all who know of the present advanced development of the subject in Germany—that geography began to be recognized as a university subject in Germany only about forty years ago. Now every one of the eighteen universities has its chair of geography and several of the *Technische-* and *Handelschochschulen* as well as the *Kolonialinstitut* of Hamburg have special geographical professorships. In all there are 29 professors and 15 instructors (*privatdozenten*) of geography at German universities. Professor Partsch then spoke of the methods of instruction. Each university has its geographical institute; its equipment depends on the size of the endowment. As a rule the equipment consists of a collection of simple surveying instruments, and facilities for map drawing and cartometry; a collection of illustrative material such as maps, models, photographs and lantern-slides; and a library of text-books, handbooks and geographical journals.[1] Instruction is given by means of lectures, seminar work and field excursions.

[1] Cf. also "Die geographischen Institute der deutschen Universitäten" by F. Regel, *Geogr. Anzeiger*, Vol. 10, 1909, pp. 149-158, 177-184, and 212-213.



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Professor Gallois's address, while dealing with the teaching of geography, gave a welcome insight into the French educational system, a somewhat confusing subject to those who are not familiar with it. Geographical instruction along modern lines dates back to the reorganization of the French universities, thirty years ago. The traditional combination of history and geography led to assigning the chair of geography in each university to the *Faculté des Lettres*. Nevertheless, the subject is taught throughout on the basis of natural science. At the University of Paris a professorship of physical geography was created about twenty-five years ago under the *Faculté des Sciences*, so that at this institution physical geography is represented in both faculties, inasmuch as physical as well as human geography is taught in the *Faculté des Lettres*.

The great majority of students of geography at French universities intend to become teachers in state secondary schools, or *lycées*, and geography is associated with history in these schools. The course of study usually covers four years or more, two for the *license*, one for the *diplôme d'études*, and one or more for the *agrégation*. While all three of these certificates—for they are not, strictly speaking, university degrees—are conferred for studies in geography and history together, the elective character of the examinations for the first two allows the candidate to devote himself almost exclusively to geographical subjects, if he so desires. The *agrégation*, however, which is a difficult competitive examination to fill vacancies in the secondary schools (there are only about 10 to 18 a year) lays great stress on history, the written examination comprising three papers in this subject and one in geography. Those who intend to become university professors may dispense with these three certificates; they must, however, have the doctor's degree. The only condition imposed upon a candidate for this degree is the writing of an original thesis on some subject accepted by the faculty. The thesis always requires several years of work; it is not a student's essay but an original piece of work representing a substantial contribution to science. For those, especially foreigners, who wish to acquire an academic degree which does not lead to a state position and who wish to devote less time to its acquisition, a so-called *doctorat d'université* has been created comparatively recently, for which a thesis of the same character but less comprehensive in scope is required.

In his remarks on geographical instruction in Austria, Professor Oberhummer called attention to the identity in development and organization, due to historical reasons, of the Austrian and German universities. No extended reference to the geographical work given in the former need therefore be made here. One innovation may be noted, however. In 1885, the chair of geography at the University of Vienna was divided into two chairs of equal rank, one for physical geography and one for political or historical geography, in recognition of the fact that the subject was too comprehensive to be taught by one man alone. The total number of geographical instructors at the higher institutions of learning of Austria is 16, viz. 10 professors (including one at the *Exportakademie* in Vienna) and 6 *privatdozenten*. Briefly alluding to secondary education, Professor Oberhummer pointed out a recent advance in the status of geography in the Austrian schools. While heretofore in the *gymnasien* (which represent the most important class of secondary schools) geography was confined to the four lower (out of a total of nine) classes, as it still is in this type of school in Germany, the subject has recently been added to the curri-

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culum of the upper classes, so that there will be no break in the course of study for those who wish to pursue the subject later on at the university.

The next speaker, Professor Chisholm, gave an interesting historical account of the development of geography in the British universities. The first successful movement made with a view to getting university recognition for the subject was made by the Royal Geographical Society of London in 1885. Dr. J. Scott Keltie, its present secretary and at that time sub-editor of *Nature*, was commissioned to investigate geographical instruction on the Continent. His well-known report[2] greatly stimulated the agitation for the movement. Not long after, in 1887 and 1888, respectively, readerships were founded at the universities of Oxford and Cambridge, the Royal Geographical Society making in each case a contribution to the salary of the reader. Since then the recognition of the subject in British universities has steadily increased. It is still best represented, however, at Oxford. The course given there at the well-known School of Geography under the direction of Professor A. J. Herbertson requires two years of study and leads to a university diploma in geography. The curriculum embraces the whole field of general geography and the outlines of the regional geography of the world, with special emphasis on the British Empire. The examination for the diploma, besides covering these subjects, includes the preparation, based on the literature available and on personal observation, of a systematic regional treatment of a small area, usually the area comprised in a sheet of the one-inch-to-the-mile map of the British Ordnance Survey, and calls for a special knowledge of two subjects to be selected by the candidate from the following: detailed regional geography of some country; climatology; geomorphology; biogeography; economic and political geography; modern historical geography; ancient historical geography; and history of geography. The teaching staff of the school now comprises three persons, in addition to its head, who give their whole time to it; there are also a lecturer on ancient historical geography and an instructor in surveying. The students are mainly school teachers, many of them graduates, but there are also intending candidates for the Indian Civil Service and other examinations.

There is a similar school of geography at Cambridge, with two readers; the requirements for the diploma do not, however, include the preparation of a geographical monograph.

In no other British university is any special qualification in geography granted. The subject, where it is recognized at all, is recognized only as one of several subjects included in the examination for a degree, whether in science or arts.

Of the newer universities of England the University of London, since its reorganization as a teaching body, has, however, devoted considerable attention to geography. There are now at least four recognized teachers of the subject at the constituent or affiliated institutions, viz., two at the London School of Economics (Professor H. J. Mackinder is head of the department), one at University College and one at Bedford College. In 1912 the University of London conferred for the first time in any British university the degree of

[2] Geographical Education: Report to the Council of the Royal Geographical Society, London (Murray), 1886. Summary in the *Report of the Commissioner of Education for 1896-97*, Vol. 2, pp. 1475-1493, Washington, 1898.

Doctor of Science in geography, for a thesis on the "Climatic Limits of Wheat Cultivation."[3]

The remaining universities at which geography is represented are: Manchester, Liverpool, Leeds, Sheffield, University College of Reading, Birmingham, University of Wales at Aberystwyth, Edinburgh and Glasgow. In spite of a movement started in 1884 by the Scottish Geographical Society for the establishment of a professorship at Edinburgh, the recognition of the subject by the Scotch universities is of relatively recent date, the lectureships in geography at Edinburgh and Glasgow having been founded in 1908 and 1909, respectively.

The last of the addresses on geographical instruction in Europe was that by Professor Chaix on Switzerland. Of the seven Swiss universities, Bern, Lausanne, Fribourg, and Geneva pay most attention to geography. The department at Bern has been particularly well developed by recent incumbents. In Lausanne anthropogeography is especially well represented, in Fribourg detailed topographic surveying as a basis to physiographic interpretation. In Geneva the subject is divided between the Faculties of Science and of Social Science, physical geography being taught in the former, economic geography in the latter.

The two addresses by American geographers, which could not be presented orally because of lack of time, deal with geographical instruction in the United States. Professor Brigham, in his address, first reviews the status of geography in our universities. The subject is there generally under the wing of geology, and hence physical geography, and especially physiography, are more fully developed than other phases. However, there is a widening conviction that geography is a worthy subject that should be represented in the university curriculum. Although even some of our major universities still wholly ignore the subject, there are a score or two that have been distinctly impressed by the geographical progress of the past twenty-five years. Among these may be mentioned Chicago, Yale, Harvard, Pennsylvania, Columbia, Wisconsin, Cornell, Nebraska and California. Chicago has four teachers of geography of professorial rank and offers more than twenty courses, including the principles of geography, climatology, cartography, anthropogeography and regional geography of various units. Yale offers courses in physical and commercial geography, anthropogeography and regional geography of the continents, except Australia and Africa. Aside from physiography Harvard's most geographical courses are given under climatology; there is also a course on the economic geography of South America. At the University of Pennsylvania the economic phase is emphasized, such subjects as transportation, resources, industry and commerce having the chief place. Geography at Columbia is mainly represented at Teachers College, where the pedagogical aspect of the subject is naturally given most attention. Both Wisconsin and Cornell relate their work intimately with geology but are giving increasing attention to human relations, especially in the economic field. Nebraska and California both offer a considerable range of geographical work, the latter having a distinct department of geography, not associated with the geological department. Several other colleges and universities treat geography to a limited degree, not because the subject appeals to the governing bodies or to the faculties as a whole but be-

[3] Published in the *Geogr. Journ.*, Vol. 29, 1912, pp. 347–366 and 421–426.

cause of the special interest of instructors. To these belong Northwestern, Oberlin, Denison, Syracuse, Beloit, Williams, Wesleyan, Brown and Colgate. In spite of this lesser development of geography at America, as compared with European universities, it must not be inferred that progress is small or that hope is to be too long deferred, for there is a prevailing admission that a new geography has come and that the doors of the higher schools must open to it.

After referring to the influence of the Association of American Geographers, through its professional membership, on high geographical standards in this country, Professor Brigham in conclusion makes an appeal for a wider recognition of geography because of its cultural value. That all should know geography appears in the universal recognition of it as a cardinal subject in the lower schools. And yet there are some high in educational administration who suppose it may be finished in the sixth grade and that the boy of twelve may be turned loose with all needed knowledge of the world in which he is to live and work. More than elementary training is imperative for many kinds of people. Students and teachers of history and economics, business men, journalists, members of the consular service, and public men in general—all can be benefited by geographical training. Experience shows with woeful certainty that such knowledge does not come by accident, or by unconscious daily absorption from books, newspapers and people.

Professor Jefferson, in his address, mainly traces the development of geographical instruction in our secondary schools. The interest in the geological aspect of the subject was reflected in the report of the Committee of Ten of the National Education Association in 1892.[4] It was characteristic that the committee thought physiography essential in the high schools if elementary school instruction in geography was to be saved from perishing. It thought something might be done towards this end by introducing courses in geology into the high schools until teachers could be trained in the new physical geography. The geography conference of that committee did recognize other aspects of geography than the rational explanation of land forms—calling them applied geography—but thought they ought to be taught in connection with the sciences to which they were most intimately related, as botany, or zoology, or history. Of human relations no notice was taken in the report of the Committee of Ten, but when the attempt was made to introduce physiography into the schools, the publishers, closely in touch with the schools, at once insisted on bringing "man" in to an extent that grew from year to year. The subsequent reaction of the schools on the university authors may be interestingly studied in the succession of text books for high school use that at once began to appear. Each successive book and each successive edition of each book was marked by more of "life" and "man." Taking the secondary school books on geography that have appeared since 1895 in groups of five years, the categories represented were as follows: 1895-1899, 3 physical geographies; 1900-1904, 4 physical geographies, 2 laboratory manuals and 5 commercial geographies (in the Committee of Ten's report commercial geography was not even named); 1905-1909, 4 physical geographies, 4 laboratory manuals and 1 commercial geography. In the last three years (1910-1912) there have appeared 1 physi-

[4] Cf. *Report of the Commissioner of Education for 1892-93*, Vol. 2, pp. 1415-1448, Washington, 1895; specifically on geography, pp. 1430-1432.

cal geography, 2 commercial geographies and three books attempting to meet the demand for some form of geography for high schools confessedly going beyond physical geography to the activities of man as a chief object rather than as an incident. In this movement the *Journal of Geography* has been an important medium for the discussion and shaping of new policies.[5]

From this summary of the addresses presented it will be apparent that the conference was a noteworthy event in the domain of educational geography in this country. On no previous occasion, it may safely be said, has a comparison of American and European educational methods in geography been presented so forcefully and authoritatively. This comparison in itself is a source of great promise; for the exchange of ideas, the intellectual contact so felicitously established by the Transcontinental Excursion, cannot but benefit the development of geography in the United States.

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[5] On the development of geographical instruction in the United States, see also Prof. C. R. Dryer's recent paper "The New Departure in Geography," *Journ. of Geogr.*, Vol. 11, 1912-13, pp. 145-151 and 177-180. Foreign comment will be found in "Amerikanische Lehrbücher für den Geographie-Unterricht" by M. Krug(-Genthe), *Geogr. Zeitschr*, Vol. 4, 1898, pp. 274-287, and "Die Geographie in den Vereinigten Staaten" by the same, *ibid.*, Vol. 9, 1903, pp. 626-637 and 666-685; and "Geographie und Geographieunterricht in den Vereinigten Staaten von Nordamerika" by K. L. Henning, *Deutsche Rundschau für Geogr.*, Vol. 35, 1912-13, pp. 446-455 and 494-500.

# GEOGRAPHICAL RECORD

## AMERICAN GEOGRAPHICAL SOCIETY

**Annual Meeting of the Society.** The annual meeting of the Society was held at the Engineering Societies' Hall, No. 29 West 39th Street, on Tuesday, Jan. 20, 1914, at 8.30 P. M.

Vice-President Greenough in the Chair.

### Report of the Council

The Annual Report of the Council was read by Vice-President Greenough:

January 15, 1914.

*To the Fellows of the American Geographical Society:*

In presenting their report for the year 1913 the Council take occasion to express their appreciation of the consistent interest and support afforded by all the members of the Society.

The year has been one of continuous progress and usefulness along the lines to which the Society is devoted as will appear by the details hereinafter submitted. Broadly speaking, the Society aims to afford a center of interest and sources of knowledge in all forms of geographical pursuit and to enlist a membership of students, scholars and others interested in the science. To this end its efforts embrace:

1. The maintenance of a research library of books and maps, with a convenient building for their keeping, acquisition and use.

2. The monthly publication in the Society *Bulletin* of matters of geographical progress or interest throughout the world.

3. A series of lectures by eminent speakers on current events and discoveries.

4. Correspondence and exchange of publications with all the leading organizations of a similar purpose throughout the world.

5. The award of suitable medals in recognition of distinguished achievement in geographical endeavor.

6. The encouragement and assistance of such projects of exploration and research as seem likely to add to geographical knowledge.

In pursuance of the above general scheme of activity the following summaries are presented:

The number of Fellows of the Society on December 31 was 1185, of which number 371 are Life Fellows.

The accessions to the library during the year numbered 1523 books and 5485 pamphlets, and 6731 maps. The facilities of the new building for reading and study are thought to be of the latest standard.

The ambition of the Society is to accumulate a library of research for geographical students which shall be at least equal to anything of the kind in America. Great progress has been made already and rapid advance in the future seems to be assured.

The monthly *Bulletin* published by the Society is maintained at a high level and furnishes a comprehensive record of geographical literature and endeavor throughout the world. The index to the volume and the bibliography have proved especially valuable to students.

The Society is in direct correspondence or exchange with 678 societies and governmental bureaus.

The meetings of the Society during the winter season have been increased in number by the addition of an inter-monthly meeting and have been largely attended by our members and much appreciated as instructive and interesting. Addresses have been made by Vilhjálmur Stefánsson, George B. Dexter, Albert B. Osborne, Ellsworth Huntington, Ellen Churchill Semple, Emery C. Kolb, Vahan Cardashian, Arthur Stanley Riggs, Hiram Bingham, the Rev. Hudson Stuck, Frederick I. Monsen.



XUM

The Charles P. Daly Medal was awarded to Alfred Hulse Brooks in recognition of the value of his work in the exploration and mapping of Alaska.

On March 19th, the one hundredth anniversary of the birth of David Livingstone, the Hispanic Society of America placed with our Society a fund for the endowment of a medal to be called the David Livingstone Centenary Medal, to be awarded by the American Geographical Society from time to time to persons who may distinguish themselves in the field of geographical research or achievement in the southern hemisphere. Designs for this medal are now being considered.

The Society was able to assist materially in two important exploring expeditions, one under Donald B. MacMillan in search for and exploration near Crocker Land in which the Society was associated with the American Museum of Natural History; and another directed by Professor Isaiah Bowman of Yale University for the purpose of completing a programme of work in the Central Andes supplementing previous similar exploration in the more northerly Andean region. A summary of the results of the Bowman expedition will be presented in the March number of the Society's *Bulletin*.

Arrangements have been made for the establishment of more intimate relations with the Association of American Geographers which it is hoped will be helpful to each and promote the efficiency of both. The publications of that Association will be sent to our members, and our publications will be sent to their members as issued. It is in contemplation to have, annually, a joint meeting of the two organizations by which interest in scientific geography may be promoted and encouraged. The establishment of a relation of mutual interest and service can hardly fail to be beneficial to both societies.

The Society has held in its building a number of exhibitions of photographs, maps and geographical memorabilia which have attracted a satisfactory attendance of our members and the public.

The policy was adopted of keeping the Society's building and collections open during the summer months instead of closing in the month of August as heretofore. The experiment has been a success, meeting the convenience of the staff and of the public, and this course will be pursued until further notice.

For the condition of the finances reference is respectfully made to the report of the Treasurer. Suffice it to say here that the receipts of the year from dues, interest and donations equalled the expenditure, and the invested fund remains unchanged.

In conclusion the Council feels justified in the opinion that never before was the Society in as good condition as at present for fulfilling the objects for which it exists. All the members of its working staff have performed their duties with zeal and efficiency and constant evidences of recognition are received from outside observers as well as from members of the Council.

JOHN GREENOUGH,
*Chairman of the Council.*

PAUL TUCKERMAN,
*Secretary.*

### Report of the Treasurer

In the absence of the Treasurer, Henry Parish, Jr., his report for the year 1913 was read by Mr. Chandler Robbins as follows:

### General Account

The Treasurer respectfully reports:

| | | |
|---|---|---|
| On January 1st, 1913, there was on hand a balance of (of which was accumulation of uninvested Capital $1,250). | | $3,077.02 |
| During the year there have been received for Fellowship Dues, Sales of Publications, Interest on Investments and Donations | $49,179.29 | |
| A legacy from the Estate of Francis M. Bacon | 1,000.00 | 50,179.29 |
| Total | | $53,256.31 |

| | | |
|---|---|---|
| There have been expended for Salaries, Meetings, Library, Publications, House Expenses, Insurance, Postage, &c. | 42,445.40 | |
| For exploration | 7,000.00 | |
| Reinvested at interest | 1,250.00 | 50,695.40 |
| Leaving a balance on hand Dec. 31, 1913.. | | $2,560.91 |

$1,000 of which is Capital awaiting investment.

REPORT OF THE NOMINATING COMMITTEE

The Special Committee appointed November 20, 1913, to nominate and invite suitable persons to fill vacancies which will occur in the offices of the Society at the date of its annual meeting in January, 1914, respectfully report that they recommend the election of the following gentlemen to the offices designated:

| | | FOR TERM EXPIRING |
|---|---|---|
| Vice-President | JOHN GREENOUGH | 1917 |
| Domestic Corresponding Secretary | ARCHIBALD D. RUSSELL | 1917 |
| Treasurer | HENRY PARISH, JR. | 1915 |
| Councillors | JAMES B. FORD | 1917 |
| | OTTO H. KAHN | |
| | GRENVILLE KANE | |
| | CHARLES H. TWEED | |
| | MADISON GRANT | |

[SIGNED] CHANDLER ROBBINS,
L. HOLBROOK,
PAUL TUCKERMAN, *Committee.*

The vote of the Society was unanimously in favor of the persons recommended by the Council and they were declared duly elected.

MR. WILLIAM CHURCHILL ELECTED CORRESPONDING MEMBER

On the recommendation of the Council, the Society elected Mr. William Churchill, of New York City, Corresponding Member. Mr. Churchill has written many monographs on ethnological and philological topics and has for some years contributed to the general and critical departments of the Society's *Bulletin.*

The following persons, recommended by the Council, were elected to Fellowship:

Florentino Telles de Menezes of Aracaju, Brazil,
Albert Bushnell Hart, Cambridge, Mass.
Charles R. Keyes, Des Moines, Iowa, and of this city,
Algernon T. Burr,
C. S. Hammond,
John Addams Linn,
T. Gilbert Pearson,
Lynde Selden.

At the conclusion of the business session, Frederic Dean, A.M. LL.B., addressed the Society on "Porto Rico, Our West Indian Outpost." He gave a vivid impression of the great population, resources and attractions of the island. Many lantern views were shown.

A regular meeting of the Society was also held on Tuesday evening, December 23, 1913, at the Engineering Societies' Hall. Vice-President Greenough in the Chair. The following persons, 16 in all, recommended by the Council, were elected to Fellowship:

John Dunbar Adams,
Henry B. Adriance,
Robert Low Bacon,
Edward P. Beckwith,
Douglas W. Dunn,
F. Herbert Filley,
R. Jay Flick,
Arthur R. Gray,
Edward Stuart Hale,
Miss Ida H. Ogilvie,
Solomon G. Rosenbaum,
George J. Sager,
Louis E. Schwab,
Edward Elwell Spafford,
Arthur Clifford Veatch,
Philipp W. Zellenka.

Mr. Frederick I. Monsen then addressed the Society on "Mexico and Her People," with lantern illustrations.

**The Index for 1913.** The index to Volume XLV of the *Bulletin* is now being printed and will be sent to our Fellows and exchanges as soon as it is off the press. Covering more than 100 pages, it embraces the important geographical literature and map products of the past year. So useful an aid to geographers and to those interested in any phase of geographical study should be accessible in the public libraries and a part of the reference material of all workers in our field. A limited number of copies will be on sale at the office of this Society. Price 50 cents postpaid.

**The late Townsend Harris.** The Society is informed by Mr. William Elliot Griffis, the lecturer and author, that the book, "Townsend Harris, First American Envoy in Japan," has been translated into Japanese and issued in an attractive volume, which sells in Japan at sixty-five cents in our money, and is therefore calculated for general reading. Mr. Harris was, at one time, President of the Board of Education in New York City. He was elected a Fellow of the American Geographical Society in 1868 and became Foreign Corresponding Secretary of the Council in 1870.

## NORTH AMERICA

**Association of American Geographers.** The Tenth Annual Meeting of the Association was held at Princeton on January 1 and 2, 1914. About thirty-five members were present and the attendance of members and non-members ranged from twenty-five to sixty. Thirty-six titles appeared in the programme and twenty-eight were read. It was one of the most enjoyable meetings the Association has held.

The officers nominated for 1914 were elected and the full Council for the year is as follows:

President, Albert Perry Brigham; First Vice-President, Charles R. Dryer; Second Vice-President, C. F. Marbut; Secretary, Isaiah Bowman; Treasurer, François E. Matthes; Editor, Richard E. Dodge.

Councillors: Lawrence Martin, Robert DeC. Ward, Alfred H. Brooks.

The nominating committee for officers for 1915 consists of C. F. Marbut, Chairman, R. H. Whitbeck, H. H. Barrows.

In his report on the meeting Secretary Bowman says:

"The Round-Table Conference, conducted by Alfred H. Brooks, was one of the most successful ever held by the Association. A remarkable degree of unanimity was shown concerning not only the plan of cooperation between the Association and the American Geographical Society, but also concerning the best means for promoting geographical research. It was the general opinion of the members that the proposed plan would tend toward a better organization of effort and a higher standard of scholarship. That part of the plan relating to a joint meeting in New York with the American Geographical Society had a most cordial reception; about four-fifths of the members present agreed to attend the first joint meeting."

At a business meeting on January 2, the plan of cooperation between the Association and the American Geographical Society was unanimously adopted. In carrying out the provision relating to the administration of a joint research fund the Council appointed the following research committee:

Alfred H. Brooks, Chairman (term expires December, 1917); Herbert E. Gregory (term expires December, 1916); Robert DeC. Ward (term expires December, 1915).

The next annual meeting will be held west of Pittsburgh at some place not yet decided upon.

The following papers were read:

H. G. Bryant (President's Address.) Government Agencies and Geography in the United States.

R. H. Whitbeck. A Geographical Study of Nova Scotia.

W. M. Davis. The Mission Range, Montana.

J. Russell Smith. The Tree as a Factor in Man's Adjustment to the Arid Environment.

R. DeC. Ward. The Weather Element in American Climate.

Howard Palmer (Introduced by W. L. G. Joerg). Glacial Features of the Selkirks.

Oliver L. Fassig. The Frostless Period in Maryland and Delaware.

Roy C. Andrews (Introduced by Ellsworth Huntington). Exploration in Northern Korea.

Leon Dominian. Geographical Influences in the Delimitation of Spheres of Foreign Interests in Asia Minor.

Lawrence Martin. Glaciers and International Boundaries.

F. E. Matthes. Lessons in Glacial Erosion from the Yosemite Region.

Robert M. Brown. The Effects of Levees on the Height of River Beds.

N. M. Fenneman. Definition and Boundaries of Physiographic Provinces in the United States.

Mark Jefferson. The Growth of American Cities.

W. L. G. Joerg. The Subdivision of North America into Natural Regions.

O. E. Baker (Introduced by C. F. Marbut). A Proposed Atlas of American Agriculture.

Frank M. Chapman (Introduced by Ellsworth Huntington). The Distribution of Life in Colombia.

Charles F. Brooks (Introduced by R. DeC. Ward). The Snowfall About the Great Lakes.

William Libbey. A Subject Catalogue of Geographical Periodicals.

Roland M. Harper. The Coniferous Forests of Eastern North America.

Richard E. Dodge. Geography Teaching in Normal Schools.

C. J. Kullmer (Introduced by Ellsworth Huntington). Storm Frequency in the United States and Europe.

Henryk Arctowski. The Pleionian Variations of Temperature: The Brachypleions of Arequipa: Macropleionian Variations in the United States.

Ellsworth Huntington. Climate and Human Efficiency.

R. H. Whitbeck. Some Economic Aspects of Glaciation in Wisconsin.

Frank Carney. A Study of the Programs of this Association, 1904, 1912.

Isaiah Bowman. The First Decade.

Alfred H. Brooks. Round-Table Conference.

**Derivation and Probable Place of Origin of the North American Indian.** In a paper with this title read by Dr. Aleš Hrdlička at the International Congress of Americanists, London, 1912 (*Proceedings of the 18th Session*, London, 1913) he summarizes his conclusions as follows: "The American natives represent in the main a single stem or strain of people, one homotype; this stem is identical with that of the yellow-brown races of Asia and Polynesia; and the main immigration of the Americans has taken place, in the main at least, gradually and by the northeastern route in the earlier part of the recent period, after man had reached a relatively high stage of physical development and multiple secondary differentiations. The immigration, in all probability, was a dribbling and prolonged overflow, likely due to pressure from behind or want, and a search for better hunting and fishing grounds in the direction where no resistance of man as yet existed. This was followed by multiplication, spread, and numerous minor differentiations of the people on the new, vast, and environmentally highly varied continent, by rapid differentiation of language due to isolation and other natural conditions, and by the development, on the basis of what was transported, of more or less localized American cultures. It is also probable that the western coast of America, within the last 2,000 years, was on more than one occasion reached by small parties of Polynesians, and that the eastern coast was similarly reached by small groups of whites, and that such parties may have locally influenced the culture of the Americans; but such accretions have nowhere, as far as we know to-day, modified the native population."

**Improving Yosemite Park.** Secretary Lane of the Interior Department, Washington, according to *American Forestry* (Vol. 19, 1913, No. 12, p. 951), has appointed an Advisory Commission looking to the improvement of the Yosemite National Park, Cal. The Commission, which consists of Ex-Mayor James D. Phelan of San Francisco, Mr. Noah Daniels, landscape gardener, Mr. Leslie Symmes, Civil Engineer, and Major W. T. Littlebrant, acting superintendent of the park, will advise with the Secretary in matters relating to the park, its improvement, its accessibility to tourists, etc.

**Return of the "Carnegie."** The magnetic survey vessel *Carnegie* has returned to Brooklyn, thus completing the circumnavigation cruise begun

in June, 1910, and covering a distance of over 70,000 miles. The vessel has been throughout under the command of W. J. Peters, and her work has been to determine the magnetic elements at sea in fulfillment of the plan of a general magnetic survey of the globe under the direction of the Department of Terrestrial Magnetism of the Carnegie Instituion of Washington. (*Science,* No. 991, Vol. 38, 1913, p. 922).

**Ohio Valley Flood of 1913.** An official report of the Ohio Valley Flood of March-April, 1913, has been issued by the U. S. Geological Survey (The Ohio Valley Flood of March-April, 1913. A. H. Horton and H. J. Jackson. *Water Supply Paper 334,* Washington, 1913). The pamphlet contains a good summary of the events preceding, during and subsequent to the flood but its contribution is mainly in the tabulated reports from a large number of stations over the entire flooded area and in the hydrographs of many localities along various streams. In order that the reader may make comparisons, the authors have included full accounts of the 1907 and the 1884 floods in the districts, and have tabulated the data of all floods since 1859. Some attempt is made to estimate the damage done by the 1913 flood. In 206 towns there was a loss of 415 lives, 60,043 buildings were flooded, 419 bridges destroyed and the property loss amounted to over $180,000,000. This is actual damage and docs not include losses due to suspension of business, decreased confidence and general depression. The report considers the possibility of a flood on the Ohio in conjunction with floods on the upper Mississippi and the Missouri and urges the government, in the face of this possibility, to establish a complete system of river control. ROBERT M. BROWN.

**The Yukon River.** The late Mr. William Ogilvie in his book "Early Days on the Yukon," just published, has these general remarks on the Yukon:

"The Yukon River is unique among rivers, in that it rises within fifteen miles of tidal waters in the Dyea Inlet on the Pacific coast, whence it flows in a north-westerly direction nearly 1,000 miles, just crossing the Arctic Circle, where it turns south-west through the middle of Alaska, and then flows more than 1,200 miles until it reaches the ocean within sight of which it rose; for we may properly call Bering Sea a part of the Pacific Ocean. This grand stream is also surprising in the length of navigation it gives in proportion to its total length, for less than fifteen miles north from where its tiniest streamlets trickle from the summit of Dyea Pass lies Lake Bennett, whose head is the beginning of steamboat navigation on this noble stream. From the starting-point of those same streamlets one can look down on other streamlets beginning their steep descent of the Dyea Pass to the waters of the wide Pacific, only as far away on the south as Bennett is on the north.

"From the head of Lake Bennett to Bering Sea is about 2,500 miles by the course of the river, and all this length, with the exception of three and a half miles at the Cañon and Rapids, is navigable; thus all its length, except the first fifteen steep miles down the slope of its source and the three and a half at the Cañon, is navigable. Can this be said of any other river in the world?"

**Progress of the Grand Trunk Pacific.** The main line of the Grand Trunk Pacific has now been completed to 303 miles east of Prince Rupert, B. C., and trains are in operation as far as mile 301 Rose Lake. Steel has been laid to mile 1240 west of Winnipeg, or 145 miles west of Tête Jaune. Trains are now running daily to Second Crossing of the Fraser River at mile 1190 west of Winnipeg.

**Altitude and Population of Mexican Cities.** A list of the more important cities of Mexico and their elevation above sea level has been compiled by Dr. E. Wittich (*Memorias y Rivista de la Sociedad "Antonio Alzate,"* Vol. 31, p. 337, 1912). The three cities in Mexico with a population over 100,000 inhabitants are the City of Mexico, population 470,659, altitude 7,421 feet; Guadalajara, population 118,799, altitude 5,118 feet and Puebla, population 101,244, altitude 7,093 feet. Of the twenty-two cities whose population ranges between 100,000 and 20,000, fourteen lie at an altitude exceeding 4,921 feet and only four are below 3,937 feet. Out of a list of twenty-seven cities ranging between 10,000 and 20,000 inhabitants, thirteen are built at elevations over 3,280 feet.

Of fifty-two cities having a population of over 10,000, twelve are situated

at an altitude above 2,000 meters (6561.80 feet), while thirty-four lie above 3,280 feet. The aggregate population of these thirty-four cities is approximately 1,750,000; while the remaining cities lying below 3,280 feet have a total population of about 350,000.

The highest Mexican town is the mining town of Real del Monte in the State of Hidalgo. Its population is 10,008, its altitude 8,927 feet. Toluca comes next at 8,819 feet, population 31,247. Zacatecas, population 25,905, follows at an altitude of 8,169 feet. Then come Pachuca, population 38,620, altitude 8,025 feet; Mixcoac, population 13,285, elevation 7,792 feet; Tacubaya, population 35,830, elevation 7,622 feet; and Guanajuato, population 35,147, elevation 6,706 feet.

## CENTRAL AMERICA AND WEST INDIES

**Population of Costa Rica.** Vol. XVI of "The Annuario Estadistico" of the Republic of Costa Rica contains a report of the chief of the Demographic Section in which the population of the republic is given as 399,424 on Dec. 31, 1912. The distribution of population among the provinces is: San José 124,109, Alajuela 95,382, Cartago 61,439, Heredia 43,304, Guanacaste 34,952, Puntarenas 20,591, Limon 19,647.

## SOUTH AMERICA

**Standard Time Adopted in Brazil.** The American Ambassador at Rio de Janeiro reports that standard time referred to the meridian of Greenwich has been adopted in Brazil and became effective on January 1, 1914. The Republic has been divided into four standard time zones. The first zone includes the archipelago of Fernando Noronha and the Island of Trinidad in which the standard time is two hours earlier than that of Greenwich. The second zone includes the whole sea coast of Brazil and in this zone the standard time is three hours earlier than at Greenwich. Two other zones in which the time is four and five hours earlier than at Greenwich cover the interior and western portions of the country. (*Hydrogr. Bull.*, Jan. 7, 1914, Washington, D. C.)

## AFRICA

**Change of Climate in East Africa.** In his account of the interior basin region of northern German East Africa (Das Hochland der Riesenkrater, Teil II, Kapitel 16, p. 179) Dr. Fritz Jaeger cites various facts leading to the conclusion that a moister climate prevailed in the recent past. The difference may have been due to greater rainfall or to lower temperature and diminished evaporation. The greater mountains, such as Kilimanjaro and Ruwenzori, show by their moraines that the glaciers formerly descended much lower than now. Very many observations show that the lakes of the regions were once at higher stands. Several examples are cited and other observers are quoted. In various places, boulders appear at such heights above valley bottoms that they could not have been deposited under present conditions. Gorge-making has taken place on mountain slopes where water scarcely flows at the present time. The origin of some alluvial gravels also betokens moister climate, as in places where the clays were deposited in swamps, while to-day grass steppes occupy the valley bottoms. Further evidence is found in the distribution of plant life. Isolated patches of forest in East Africa show strong relationship with the forests of Central and West Africa and are believed to be remnants of a more widely distributed forest flora. Of the same meaning is the similarity of high mountain floras in widely separated localities. While conceding that some of the suggested evidence may call for further investigation, the author regards the phenomena of the moraines, the lake beaches and the distribution of plants, as fully conclusive. A. P. BRIGHAM.

## ASIA

**Settlement of the Turco-Persian Boundary Contest.** The signing of the Constantinople protocol of November 17, 1913, by the Grand Vizir and the ambassadors of Great Britain, Russia and Persia ended the controversy between the Turkish and Persian governments regarding their boundary line.

XUM

According to *Asie Française* (November, 1913, p. 488), the contested zones of Bariga, Torgever, Desht, Morgever, Vahuu and Zerivan, all in the northern section of the boundary zone are definitely assigned to Persia. At the southern end of the frontier, the waters of Shott-el-Arab with most of their islands remain under Turkish sovereignty. Persia acquires Muhalla and six of its island administrative dependencies. Persian jurisdiction over Mohammerah is confirmed without reservations. A commission consisting of British, Russian, Turkish and Persian delegates will start early in 1914 to survey the region. It is expected that the work will require at least eighteen months. The Russian and British commissioners are to act as umpires in the event of any divergence arising between the Turkish and Persian representatives.

**The Languages of Borneo.** The interest of the Rajah of Sarawak in the affairs of his dominion, has provided the funds whereby the Sarawak Museum has been enabled to begin the publication of its journal. The fourth number of that publication preserves for the students of the life of central Indonesia a very considerable record of speech in "The Languages of Borneo" by Sidney H. Ray. This valuable volume is so arranged as to coordinate with Mr. Ray's great report on the philology of the Cambridge expedition to Torres Straits, the vocabulary containing the same elements and in the same order. Linguistic science has recently become particularly interested in the obscurer languages of this area because of the immediate promise that they provide an approach to a new philology of primitive speech. Mr. Ray's contributions of such data will do good service in their presentation of necessary material.

WILLIAM CHURCHILL.

## POLAR

### ANTARCTIC

**Exploration of King Edward VII Land.** Mr. J. Foster Stackhouse is endeavoring to organize an expedition with the object of charting the coast of King Edward VII Land. It is proposed to leave England in August, 1914, and proceeding south by way of the Falkland Islands, to enter the ice in about 70° S., 100° W. It is hoped that this position will be reached by the end of December, and the vessel will proceed as far south as possible while the summer lasts. If it be practicable to make the land, Mr. Stackhouse proposes to winter in some convenient harbor; otherwise it will be necessary to winter in the pack and proceed to the west during the following summer, before the end of which it is hoped that the homeward voyage will be begun. If necessary, however, Mr. Stackhouse proposes to spend a second winter in the ice, and do further work during the following summer. It is stated that a strong staff of scientists will be carried and the vessel selected fully equipped for scientific research. The total cost of the expedition is estimated at £40,000. (*Geogr. Journ.*, Vol. 42, 1913, No. 6, p. 575.)

### ARCTIC

**By Sea to the Yenisei River.** Captain Joseph Wiggins proved, in 1875, the possibility of opening a commercial sea route from the Atlantic and through the Kara Sea to the Yenisei River, Siberia. Last year a company, backed by British, Russian and Norwegian capital and managed by Dr. Jonas Lied of Norway, chartered the steamship *Correct*, sent her with a mixed cargo to Siberia through the Kara Sea and brought home a cargo of Siberian produce which was discharged at London. Dr. Nansen made this journey to the Yenisei. In a lecture before the Imperial Geographical Society of St. Petersburg, he endorsed Captain Wiggins and his followers as to the possibilities of the route but added that more than one voyage during the season should not be undertaken until we know more about the ice conditions in the Kara Sea. Although navigation is nominally practicable during July, August and September there seems to be no certainty of getting through the ice except towards the end of the period. He approved of the wireless stations that have been opened at the straits leading into the Kara Sea and on the Yamal Peninsula but believed that a fourth wireless station should be established at Dickson Harbor at the mouth of the Yenisei. He advised the Russian Government to

explore the Kara Sea in all directions during the season of navigation by means of a small fleet of motor sailing vessels which should report by wireless to the radio stations the exact conditions in different parts of the sea. He also advised that aeroplanes be used in connection with the radio stations to explore the surrounding waters.

The Russian Government has decided to create a regular pilot service, to develop the wireless stations and to supplement them by aeroplane and other auxiliary services as recommended by Dr. Nansen. A subsidy will be paid for five years to the firm that sends in the most satisfactory proposal for the establishment of regular steamship traffic between a port on the Baltic and the mouths of the Ob and the Yenisei calling at Hamburg, London and other ports. The line must be run under a Russian flag and preferential rates given to Russian goods. (Condensed from the *London Times*, Russian Supplement, Dec. 15, 1913, p. 11.)

## PERSONAL

Professor Cleveland Abbe, the distinguished meteorologist of the U. S. Weather Bureau, celebrated his 75th birthday on Dec. 4.

Professor Charles R. Dryer has retired from the chair of Geography and Geology in the Indiana State Normal School at Terre Haute after twenty years service. He has changed his domicile to Oak Knoll, Fort Wayne, Ind., but is spending a part of the winter in New York. His successor at Terre Haute is Bernard H. Schockel, M.A., late of Chicago University, who will be glad to receive any communications relating to his department.

Professor Douglas W. Johnson of Columbia University lectured before the American Scenic and Historic Preservation Society at the American Museum of Natural History, Jan. 14, on "The Scenery of the Atlantic Coast and Its Answer to the Question: Is the Coast Sinking?" Colored lantern views of all parts of the coast were shown.

## GENERAL

**Atlas to Illustrate the Forms of Terrestrial Relief.** The preparation of this atlas was approved at the Ninth International Geographical Congress in Geneva. A committee was appointed which evolved a plan for carrying it out, found a publisher and also obtained pecuniary aid to produce a specimen number and distribute it among scientific bodies.

At the Tenth Congress in Rome, March 27-April 3, 1913, Professor Émile Chaix of Geneva said that possibly the first series of from forty-five to forty-seven plates would be in the hands of subscribers by the end of 1914. General Schokalsky moved: "The Tenth International Geographical Congress approves of the plan adopted for carrying out the project and the execution of the work so far as it is yet done. It strongly recommends all geographers and all scientific institutions to aid this enterprise in every possible way." The resolution was adopted and was confirmed at the final meeting of the Congress.

The Society has received a letter from Marquis Cappelli, President of the Congress, requesting the geographers of all countries to give every aid in their power to the carrying out of this important work. He bespeaks the suggestions and assistance of geographers and geographical societies.

**Warning Ships on their Approach to Icebergs.** Before the *Titanic* disaster Prof. H. T. Barnes of McGill University was at work on the problem of warning ships of their approach to icebergs ("Icebergs and Their Location in Navigation," *Annual Report Smithsonian Institution, 1912*, pp. 717-740, Washington, 1913). By his invention of the microthermometer, a self-recording thermometer which measures temperature changes of a tenth of a degree, Barnes has shown definitely that the temperature *rises* as icebergs are approached though it falls rapidly in the immediate neighborhood of the bergs. This has been tested in detailed experiments in the Straits of Belle Isle, in a voyage from the St. Lawrence to Hudson Bay, and in several trips across the Atlantic Ocean. Icebergs eight to twelve miles from the ship affect the microthermometer notably, and within a quarter mile of the berg the rise of temperature is very sharp indeed. LAWRENCE MARTIN.

# GEOGRAPHICAL LITERATURE AND MAPS

(INCLUDING ACCESSIONS TO THE LIBRARY)

## BOOK REVIEWS AND NOTICES

(The size of books is given in inches to the nearest half inch.)

### NORTH AMERICA

**The Trail of Lewis and Clark, 1804-1904.** A story of the great exploration across the continent in 1804-06; with a description of the old trail, based upon actual travel over it, and of the changes found a century later. By Olin D. Wheeler. Vol. 1: xxiii and 377 pp. Vol. 2: xv and 419 pp. Maps, ills., index. G. P. Putnam's Sons, New York, 1904. $4 a set. 8½ x 6.

This work is and will be very useful. It is a well illustrated account of the Lewis and Clark expedition with copious extracts from their journals, explanations of parts of the original narrative, descriptions of the present aspects of the vast region through which the pioneers blazed a way, accounts of the later fortunes of Indian tribes first revealed in the epic story; and it gives, besides, probably the best solution that will be reached of problems relating to the exact routes followed at certain stages of the journey.

The story of this greatest of North American explorations teems with interest; and this book with the side-lights that the author's long studies enable him to throw upon the enterprise may be commended as a reliable and complete account of it.

**American Irrigation Farming.** A systematic and practical treatment of every phase of irrigation farming, including its history, with statistical tables and formulas. By W. H. Olin. 364 pp. Ills., index. A. C. McClurg & Co., Chicago, 1913. $1.50. 8 x 5.

Mr. Olin who has studied irrigation farming problems for the past ten years throughout the entire irrigated area of Colorado, Wyoming, and Idaho, says that the total cost per acre of growing potatoes under irrigation is $38.50 and one irrigated district of 3,000 acres of potatoes is producing better than 300 bushels per acre. This is only one instance in many. Other crops pay proportionately as well, and it is with the purpose of showing the novice as well as the seasoned farmer how these large yields may be obtained, that the book is written.

Starting with a history of irrigation and an explanation of its fundamental terms, the author next considers the various types of soils; the habits of plants in arid regions; preparation of the seed bed; methods of levelling the ground for effective irrigation; detailed directions for planting, caring for, and harvesting those crops best suited to irrigation; best rotation of crops; in short, everything which is required for a thorough and practical understanding of farming by irrigation. The volume concludes with statistics and working tables. WILBUR GREELEY BURROUGHS.

**The Climate and Weather of San Diego, California.** By Ford A. Carpenter. xii and 118 pp. Charts, ills., index. San Diego Chamber of Commerce, 1913. 7 x 5.

Mr. Ford A. Carpenter was for sixteen years Local Forecaster at San Diego. He evidently writes *con amore*. A more charming account of local climate we have never seen. There is a charm of style and an attractiveness of presentation which cannot help leaving the reader who has never been in San Diego with a strong desire to take the first train for that favored spot. That the

author loves San Diego and every phase of its climate and weather is obvious on every page. He even speaks of the "desirable features" of the desert wind, and of the "beneficial effects" of the famous coast fogs. There are some unusually good cloud pictures, several of which give an excellent idea of the general situation of the city. So up to date is the little volume that the famous January "freeze" of the present year is mentioned. On this occasion the San Diego record of not having had a minimum temperature below 32° within the period of observation was broken. The minimum in January, 1913, was 25°. The book is published by the San Diego Chamber of Commerce, and is therefore pretty clearly intended for advertising purposes. But there is little or no undue exaggeration in it. Mr. Carpenter is to be congratulated upon having written so delightful an account, and so complete a one, of San Diego's weather and climate. We wish there might be more like it for other places. R. DEC. WARD.

**Animal Communities in Temperate America as Illustrated in the Chicago Region.** A Study in Animal Ecology. By Victor E. Shelford. xiii and 362 pp. Map, ills., index. *Geographic Society of Chicago Bull. No. 5.* Univ. of Chicago Press, 1913. $3.22. 10 x 7.

This study in animal ecology is based upon material accumulated during ten years of field study. The material was collected in the area about Chicago—an area some 80 miles wide and 134 miles long.

The general principles of animal ecology are discussed in the first six chapters. The opening chapters deal with man's relations to nature,—especially to animals. This includes both the economic relations of animals to man as well as the influence of man on animals.

The following two chapters deal with the relations of animals to their environment together with the different types of environments. The author mentions the most important factors of the environment as being "water, atmospheric moisture, light, temperature, pressure, oxygen, carbon dioxide, nitrogen, food, enemies, materials used in abodes, etc. In nature the combinations of these in proportions requisite for the abode of a considerable number of animals are called "environmental complexes." The author states it as his purpose to consider animals as inhabiting environmental complexes, rather than to isolate their responses to various single factors. He further calls attention to the distinction between "local" and "climatic" environmental complexes. Those environments coming under the head of climatic, are such as climate proper, and such features as types of vegetation of any considerable extent, as "steppe," "deciduous forests," etc. Local environments lie within the climatic, as for example, such local conditions as ponds, lakes, streams, soils, exposure, etc. It will be observed that these are geographical in nature.

The Chicago area is represented by two geographical environmental complexes,—the savanna, and the deciduous forest,—badly broken up by many local complexes.

The author now considers the various communities of ponds, lakes, streams, swamps, forests, thickets, prairie, etc., from the standpoint of reactions to their environments. Tabulated lists of animal data are given at the ends of each of these chapters. These include the common and scientific names of the animals found, the habitat from which collected, and the particular local environment. These habitat records are very exhaustive and include the names and environments of nearly 1,000 species of animals.

There are over 300 splendid animal figures and several maps and diagrams, thus making the volume of great value not alone to teachers and collectors, but also to students of geographical distribution.

This excellent bit of pioneer work concludes with a chapter on a general discussion of (a) the relations of different communities to one another, (b) the laws governing distribution, (c) a discussion of the relations of ecology to broader geographical problems. This latter discussion is especially interesting and suggestive. He says "the relations of ecology to human geography are especially intimate. The parallelism between the geographical phenomena in animals and the relations of culture to environment lie not in color and structural adaptations of animals, but in the *behavior-characters* of

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animals which enable them to live under a given set of conditions, and the *behavior* which those conditions produce. Finally, animal ecology offers the material and methods with which many ideas of geography may be experimentally verified.

This book is unique in that it is a pioneer of its sort and the first serious attempt to treat of the physiology of organisms and of animal communities in such shape as to serve as an adequate text and reference work for students. There is an adequate bibliography of 214 references, as well as author and subject indices. R. W. SHARPE.

**Geology of the Columbus Quadrangle.** By Clinton R. Stauffer, George D. Hubbard and J. A. Bownocker. viii and 133 pp. Maps, ills., index. Bull. 14, 4th Series, Geol. Surv. of Ohio. Columbus, Ohio, 1911. 9½ x 6½.

Part I, Historical Geology, was prepared by Dr. Stauffer; Part II, Physiography and Surficial Geology, by Prof. Hubbard, and Part III, Economic Geology, by the State Geologist. Part II is the longest of the sections. The report is designed primarily for the use of school and college students and teachers. The authors doubtless had in mind the service which such a report might be to classes in the state university.

In Part II, Prof. Hubbard describes and interprets the present general topography, and gives an account of the pre-Wisconsin, the Wisconsin and the post-Wisconsin changes in topography. He finds satisfactory evidence of two glacial epochs, widely separated in time, but is not sure of more than two. Buried valleys are numerous; at least thirty-two, crossed by present streams, are noted. The many moraines of the area and their attendant features are described in considerable detail. The relatively small area mapped makes possible an amount of detail not usually found in state reports. The volume constitutes an excellent field manual, and the painstaking quality of the work, the three maps in the pocket, and the exceptionally good plates, all reflect credit upon the authors. R. H. WHITBECK.

## AFRICA

**Camera Adventures in the African Wilds.** Being an Account of a Four Months' Expedition in British East Africa, for the Purpose of Securing Photographs of the Game from Life. By A. Radclyffe Dugmore. xix and 233 pp. Ills. Doubleday, Page & Co., New York, 1910. $6. 11 x 8½.

Noteworthy both for its remarkable photographs and its informing letterpress. The author was once an enthusiastic Nimrod but in recent years he has found far greater pleasure in hunting with the camera. He has to-day an international reputation for the superiority of his photographs of animals, nearly all of them taken in the open and, in many cases, when the subject of the picture was too near the camera for the comfort of nervous photographers. A large number of these photographic reproductions appear in this book without retouching or other improvement. The book is thus a vivid record of the most conspicuous animal life of British East Africa and as such will be more valuable as time goes on for the wild life that has added so much to the repute of this part of Africa is destined largely to disappear as the land becomes more and more devoted to the service of man. The pictures also show many phases of the native life. The textual information, in point of interesting and informing quality, is worthy of the pictures.

**The Fetish Folk of West Africa.** By Robert H. Milligan. 328 pp. Ills. Fleming H. Revell Co., New York, 1912. $1.50. 8½ x 6.

It is seldom that records of missionary service are reliable material for social and ethnological study, but the readers of this delightful volume on the Fetish Folk of West Africa will quickly recognize an exception. The warp and woof of the book is a survey of the life, habits, and social customs of the

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Mponge and Fang tribes of the French Congo, with especial reference to the fetishism which the writer defines as belief in the residence of spirits in certain objects of nature. Broadly speaking, these objects fall into three classes in an ascending scale, the charm, the fetish proper, and the relic, chief of which is the ancestral skull. Whatever its exact nature, belief in it is the controlling *motif* of the people among whom it is found.

In tracing the moral and mental results of fetishism Mr. Milligan makes an analysis of the West African character which is sympathetic and illuminating. Against this as background is thrown the story of a missionary's adventures on the coast and in the interior, of his journeys in the steam yacht *Dorothy*, of the establishing of a boy's school, and lastly, of the results of Christianity as an instrument of social and moral progress. Altogether the volume is one of much merit and vivid interest. HELEN S. OGDEN.

**Études Bakango** (Notes de Sociologie Coloniale.) Par A. de Calonne Beaufaict. 152 pp. Ills. Mathieu Thone, Liège, 1912. 10 x 7½.

It is pleasant to find in the Belgian administration of the Congo such unmistakable evidence of sympathy with cultural childhood as this work offers. M. de Calonne in these pages deals with a riverine folk whose terrain is no more than a ribbon, a single kilometer in width and 400 in length along the banks and islands of the Welle, between the rapids of Mokwangu and Panga. He sketches their progress in such arts as they need and supplies the beginning of a vocabulary of their speech which they denominate Likango. But the chief theme of the volume is his careful and brilliant discussion of the development of this negro state. They are a folk of but a single industry, their life depends on the fish of the river, and their culture has evolved wholly from the needs of the angler and from the advantages over their neighbors which the art of fishing has given to the Bakango. We are, of course, familiar with the specialization of particular industries within the community in operative classes or castes; this is a wholly new condition to which we are introduced in the study of a race devoted to a single industry and cutting through a succession of other race-communities through their command of the waterway, an interesting parallel with our ancient common law that a charge of trespass might not lie against any one who came by water. He examines with skill the evolution of the social unit, in its origin a patriarchal unit of polygamy but always subject to scission whenever it becomes unwieldy. In a clever computation of the goods of the community unit he states in terms of accountancy that the total fixed capital to assure the livelihood of seven adults and a considerable number of dependent children does not exceed in canoe and nets and all furnishings so minimum a sum as $20.

WILLIAM CHURCHILL.

**La Tripolitaine Interdite. Ghadamès** Par Léon Pervinquière. 254 pp. Maps, ills. Hachette et Cie, Paris, 1912. Fr. 5.50. 7½ x 5.

The famous Saharan town of Ghadamès is now in the Italian domain of Libya as a result of the Italian-Turkish war. This book shows Ghadamès* as it is to-day. Pervinquière gives a sketch of its history, still little-known though it is probable that the town antedated the Roman conquest. The distinctive features of the book are that the author tells so much of the town and its people and adorns his narrative with so many photographs. Considering that he employed his camera only under the greatest difficulties he met with surprising success. He shows us in picture and text the somber, roofed streets, groups of the people and the wonderful lake fed from sources of artesian depth that ages ago turned this little area into a garden amid the aridity of its surroundings. The book is the latest and one of the best descriptions of the Ghadamès oasis which comprises only a little over 200 acres, is the home of some 3,000 souls and contains about 25,000 palm trees. It was most flourishing commercially before the recent decline of the Saharan trade between the Mediterranean States and the Sudan which cut off most of its carrying trade.

*Rohlfs wrote that Rhadames was the more accurate transliteration and his spelling is also in use.

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**L'Eritrea Economica.** Conferenze di Ferdinando Martini, O. Marinelli and others. xiv and 542 pp. Maps, ills. Biblioteca Geogr. dell'Inst. Geogr. de Agostini, No. 1. Novara-Roma, 1913. L. 16. 10 x 7.

Fifteen specialists have contributed as many chapters (originally prepared as lectures), each dealing chiefly with the more important economic problems pertaining to the region. The book is therefore particularly free from weak parts which are often noticeable whenever a single author attempts to prepare a compilation of this nature. Its only defect lies in the lack of a recapitulation in which résumés of each chapter should have been correlated in a comprehensive survey. This task is left to the reader.

Promise of future Eritrean prosperity in agriculture and stock-raising is revealed. Indications of mineral wealth are likewise recorded. There is some tendency towards exaggerated optimism but, on the whole, the chapters are characterized by great accuracy of data. The book is the first of a series which bids fair to be valuable. The publishers have given proof in recent years of the excellence of their geographical publications. LEON DOMINIAN.

**Vom Kongo zum Niger und Nil.** Berichte der deutschen Zentralafrika-Expedition 1910-1911. Von Adolf Friedrich Herzog zu Mecklenburg. Vol. 1: x and 324 pp. Vol. 2: x and 398 pp. Maps, ills., index. F. A. Brockhaus, Leipzig, 1912. Mk. 20. 9½ x 6½ each.

This second expedition to Central Africa by the Duke of Mecklenburg has thrown light on some of the darkest parts of the continent. Although the original project of crossing the whole width of the continent could not be carried out owing to adverse political conditions in French Wadai, the expedition covered considerable ground by dividing itself into branch expeditions whose combined routes amount to 8,078 miles of travel. Starting at the mouth of the Congo the main expedition went to Kinshassa on Stanley Pool, where the botanist Dr. Mildbraed and the entomologist Dr. Schultze were detached for a trip into southern Kamerun. The rest of the main party proceeded up the Congo and Shari rivers to Lake Chad, remaining there some time to study the shores and especially the little known islands of the lake. Then the ethnologist Lieut. Von Wiese and the zoölogist Dr. Schubotz separated from the party to try the crossing of the continent in a more southerly direction, the former succeeding along the courses of the Ubangi and Mbomu rivers, the latter along the Welle, to the Bahr-el-Ghazal and the Bahr-el-Gebel rivers, respectively. The rest of the main expedition, consisting of the Duke, the physician Dr. Haberer, and the painter Mr. Heims, separated temporarily in their turn: the first two penetrated into Bagirmi as far as Melfi, returning through *terra incognita* via Busso (on the Shari) and Bongor (on the Logone) to Garua on the Benue, where they were again joined by Heims who had in the meantime explored the Musgum country in the German part of Bornu. From there they went down the Benue and Niger to embark for home at the rising port of Forcados, Niger Delta. The two gentlemen of the Kamerun expedition made an additional trip to the islands of Fernando Po and Annobon.

This division of labor naturally makes the reports somewhat unlike in character, because each scientist reports on the territory visited by him from his special scientific point of view. The reports, with the possible exception of the South Kamerun branch, do not therefore give truly all-round geographical pictures of their respective territories. But even so they contain much new information of high geographical value on the parts of Africa visited.

The South Kamerun expedition gave much attention to the topography of the country. It was ascertained to be a peneplain sloping gently toward the Sanga River and not exceeding 900 meters in height, which is below earlier suppositions. Only its western parts show a greater variety of relief and a greater height of individual peaks. Zoölogically the region belongs to the Congo province, the transition to the coastal fauna being very gradual. The entomological discoveries were gratifying. The flora showed several distinct provinces which seemed to correspond to political (ethnological?) divisions. It is a pity that, especially near the leading roads, the original condition of the vegetation is fast disappearing, so that a scientific study of it will soon be impossible.

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In Dr. Schubotz's expedition the zoölogical interest was predominant. He wished to ascertain the boundary between the faunas of the tropical forest and the steppe. He found that the forest represents a zoölogical unit by itself, perhaps the most clearly defined zoölogical sub-region of Africa. The fact that certain forms have been found so far only in one or another part of it is not a proof of the contrary but is easily explained by the vastness of the territory and our insufficient knowledge of it, and by the comparative scarcity of the forms themselves. Of the most coveted of them, the okapi, Dr. Schubotz killed two, taking also the first photograph of a freshly killed one. The "gallery" forests which skirt the rivers in the border region of the forests proper, are probably relicts of them, and derive their fauna from them. The fauna of the steppe, on the other hand, seems to be derived from another zoölogical center, which may have been located in North Africa.

Ethnological discovery was the main object of Von Wiese's expedition, but it was richly supplemented by other work. This is especially gratifying because the progress of "civilization" even in remote parts of Africa makes the securing of genuine material and information more difficult every year. At Fort Lamy (Bagirmi) a native tailor's shop was even found to contain a sewing machine!

The Duke himself collected a large amount of perfectly new material on Islam in North Kamerun. Elaborate question blanks supplied by the Colonial Institute at Hamburg were answered *in situ*, valuable native manuscripts were secured and several native scribes wrote historical and genealogical data of their tribes for the expedition. From the evidence thus collected it appears that Islam was introduced into these regions from the north, *e. g.*, from the western Sahara, with the exception, of course, of the Arabs who are of eastern origin and share the beliefs of the East.

The linguistic conditions in the Duke's field of work were very complicated. The three principal idioms of Africa meet there: the Hamitic, Sudanese, and Bantu languages, all of them interspersed with Arabic acquisitions. The linguistic collection of the combined expedition comprises specimens of seventy-one different languages, including forty phonograms, which will afford quite a new basis for African philology. The purely ethnological collections contain about 4,300 pictures, photographs, and drawings, together with over 4,000 ethnological objects. Of especial interest is the description of the Pygmies in the report of the South Kamerun expedition who seem to be related to the Pygmies of the upper Nile, although much of their civilization and even many words of their language are borrowed from their negro neighbors. In Von Wiese's report, the tribes between the Shari and Ubangi rivers, some of whom had not been visited since the days of Junker and Marchand, present a strange combination of native Arabic, and European customs and influences. The three sultanates of the Asande: Bangassu, Rafai, and Semio, which were chosen for temporary headquarters, afforded the author ample opportunity to study both the character and condition of the people, and the methods of the French government. Unfortunately the influence of the latter is very small in these far-away regions, as Von Wiese experienced himself in a very annoying way by the difficulty of securing the necessary number of carriers.

MARTHA KRUG GENTHE.

## ASIA

**Turkestan.** By Prince V. I. Massalskyï. Vol. 19 in the Series: Russia. A Full Geographical Description of Our Country. Under general supervision of P. P. Semenov-Tian-Shansky, and V. I. Lamanskyï. Edited by V. P. Semenov-Tian-Shansky. [In Russian]. x and 861 pp. Maps, ills., bibliog. index. A. F. Devrien, St. Petersburg, 1913. Roubles 5.50. 9 x 6½.

The author's aim is to show what development has been made in Turkestan since the Russian occupation over forty years ago. As Turkestan has great industrial importance, over a third of the book is given to economic topics, such as laws governing the distribution of water for irrigation, new irrigation works, railroads, etc. Special attention is given to cotton, silk and fruit growing. The author thinks that the Khanates of Bhokara and Khiva must fully be brought under the Russian régime for their own good and that of the rest of Turkestan.

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**The Land of the Blue Poppy.** Travels of a Naturalist in Eastern Tibet. By F. Kingdon Ward. xii and 283 pp. Maps, ills., index. University Press, Cambridge, 1913. G. P. Putnam's Sons, New York. 12s. 9½ x 7.

The author has touched little fresh territory in this volume. But eastern Tibet has been so little explored that even in the footsteps of others each newcomer can find much of interest. Mr. Ward entered the region on a botanical mission and therefore the trees of the mountains and the flower of the field engage our attention in these pages. The record day by day cannot fail of interest, for the author is most observant.

**Zeemansgids voor den Oost-Indischen Archipel.** 5 vols. with supplements. 3d edition. Ministerie van Marine, Afdeeling Hydrographie. Mouton & Co., The Hague, 1912. 9 x 6 each.

An official series of guide books prepared for navigators in the waters of the East Indies Archipelago with descriptions of prevailing wind and weather, currents, tides, and coasts, harbors, anchorages, etc., and a supplement to each volume showing profiles of coasts.

**The Progressing Philippines.** By Charles W. Briggs. 174 pp. Maps, ills., index. Griffith & Rowland Press, Philadelphia, 1913. 50 cents. 8 x 5½.

This small volume written by a missionary as a text book for classes in mission study gives a brief survey of the geography, ethnology and history of the Philippines and a more extended account of the religious progress and status of the Filipinos. It is illustrated with a large number of photographs, many too small to be of value. If any criticism on the side of geography is just of a book so avowedly a study of missionary fields it would be that the controlling causes of the life of the natives are not sufficiently explained. The account of the Filipinos and the social classes on the islands is more extended. This to the lay reader is the most valuable part of the book. After a brief history of the Philippines from the discovery by Magellan, the author discusses the religious evolution of the people. In this he has some views that will not meet with general acceptance. ROBERT M. BROWN.

## AUSTRALASIA AND OCEANIA

**The Making of the Australian Commonwealth, 1889-1900.** A Stage in the Growth of the Empire. By Bernhard R. Wise. xiii and 365 pp. Index. Longmans, Green & Co., New York, 1913. $2.50. 9 x 6½.

This is not a study in government but a record of the brief struggle for Australian federation. The scene of the book is New South Wales, although appendixes give a brief review of the situations in Tasmania and Victoria. A chronological account of events which centered around a few leaders for and against the more independent government policy is the story of the book.
ROBERT M. BROWN.

**New Zealand and Adjacent Islands.** By P. Marshall. 79 pp. Maps. Carl Winter, Heidelberg, 1912. 10½ x 7.

This convenient work was designed to be a chapter in Steinmann and Wilcken's encyclopedic handbook of regional geology. Abstracted for separate publication it loses the advantage of its position in the greater work and impresses at first sight with a sense of cramped presentation. Yet it will be found a concise and clear statement of the great geological movements of New Zealand and a very complete reference to the literature of the subject. No one could be in better position to condense the knowledge of New Zealand, its modern geography and the land building forces which at several epochs have acted upon the islands, than Prof. Marshall, for his text book of the geography of New Zealand stands as the standard work. It is interesting to observe that he has been content to summarize the various opinions about the recently extinct moa without committing himself to any opinion of his own. It calls for scientific fortitude in New Zealand to refrain from a theory of that remarkable fowl.

**Twenty-One Years in Papua.** A History of the English Church Mission in New Guinea (1891-1912). By Arthur Kent Chignell. xv and 157 pp. Map, ills. The Young Churchman Co., Milwaukee, 1913. $1. 7½ x 5.

The scene of this unpretentious yet important little volume is the north shore of the southeastern extension of New Guinea from Samarai to the German boundary line. Effectively it covers not much more than the distance to the second cape to the northwest, for the progress of all mission labor in New Guinea has been as slow as it is dangerous. With great sacrifices the missionaries who have worked upon this coast (among the pioneers this author stands), have given us all we know of the geography and ethnology of the region and for a long time to come we shall have to rest upon their endeavors. Having made a reconnaissance of that shore line several years before it was assigned to the Church Missionary Society I can certify to the essential accuracy and value of the geographical material contained in this narrative.

WILLIAM CHURCHILL.

**The Belief in Immortality and the Worship of the Dead.** By J. G. Frazer. Vol. 1: The Belief among the Aborigines of Australia, the Torres Straits Islands, New Guinea and Melanesia. The Gifford Lectures, St. Andrews, 1911-12. xxi and 495 pp. Index. The Macmillan Co., New York, 1913. $3.25. 9 x 6.

With this volume Dr. Frazer begins a work which may be expected to rival the "Golden Bough" in magnitude. He follows exactly the same method in this as in the former work, very encyclopedic in the massing of material from every source, diffuse and oppressive by its mass. He does not yet make clear to what end these new studies are directed, therefore we have no hint as to the theory of interpretation with which we should regard this mass of data.

We may properly assume that it is only for mechanical reasons in making a volume that in this first volume he deals with cultures so diverse as the Australian and the Melanesian, for there can be no logical association of the wanderers of the continent and the sedentary societies of the islands.

A much more grave defect of this work is that while Dr. Frazer assembles a large amount of material germane to his topic, so much material that we may feel convinced that it was his intention to gather up all with no omissions, he does not undertake to evaluate any of the material. I do not assume to comment upon this matter in reference to the Australians, for my acquaintance, even in part familiarity, with those races is just sufficient to serve as a warning against rash criticism. But Melanesia I know, with the literature of the subject I am familiar and have enjoyed the opportunity to subject it to critical examination in the field. I instance this objection by citing the lectures upon Fijian custom. Dr. Frazer gleans, rather he reaps, the crop from Williams, from Fison, from Basil Thomson, yet nowhere does he suggest that these authorities widely vary. Williams had the advantage of being early in the field, of observing each detail of custom while it was still a matter of living faith. That should stamp him as an authority of the first rank. Unfortunately his record is under grave suspicion; we know it to have been falsified and the original is no longer recoverable. Lorimer Fison I knew in Fiji as a very careful observer so far as is possible to one who has had no schooling in ethnography, and the period of his observation has been the period when contamination with foreign vices and foreign virtues has become well established in Fijian life. Basil Thomson has observed with special skill, with an insight into the philosophy of culture and social life, but his observations are as modern as my own. Here we have the great objection to all of Dr. Frazer's work. The amount of information which he amasses is enormous, but quantity can never supply the place of quality. Lacking record of the competency of the witnesses we cannot estimate the evidential value of their testimony, therefore we lack confidence in the proof based upon such material.

Furthermore in the present volume Dr. Frazer seems to proceed on the assumption that death and the soul and life hereafter (he pays scant attention to the belief in a death of the soul as a terminus of a life hereafter) are matters of great importance. In the life of these primitives death is a negligible incident. The life after death seldom reaches the concept of immortality

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and in common is looked forward to as an inconvenience which the soul must undergo and which it seeks to throw back upon the survivors of the family.

WILLIAM CHURCHILL.

## EUROPE

**The Story of the Forth.** By H. M. Cadell. xvii and 299 pp. Maps, ills., index. James MacLehose & Sons, Glasgow, 1913. 16s. 10 x 7½.

The story of the Forth is a story worth reading and may well appeal to the physiographer, the student of industrial history or the engineer. Beginning in the remote past before the Carboniferous period, the reader is lead through various changes of landscape to the present. The chapter devoted to the long struggle for supremacy between the drainage of the Clyde and the Forth is the most interesting. The diagrams and the imaginary landscapes add much to the effectiveness of the presentation. The volume contains many excellent maps that should be studied by every student of European physiography for they present in clear and usable form the essentials of the physiographic history of the Forth so skillfully portrayed. From the physiographic standpoint the volume is a distinct contribution, none the less to be commended because it will appeal to the layman who can read it with understanding and interest.

RICHARD ELWOOD DODGE.

**La Race Slave.** Statistique-Démographie-Anthropologie. Par Lubor Niederle. Traduit du Tchèque par Louis Leger. Nouvelle Collection Scientifique. xii and 231 pp. Map. Félix Alcan, Paris, 1911. Fr. 3.50. 7½ x 4½.

With the question of Pan-Slavism always at the background of the politics and domestic statecraft of Eastern Europe this manual will serve to satisfy such as wish to acquire a superficial familiarity with the problems of Slavic life and to direct the more advanced studies of such as may be attracted to detailed investigation of a most interesting culture. The race has long existed without political entity. For centuries it has been the protesting and suffering minority in kingdoms and empires. It has by turns been used, been tolerated, been abused in Russia, in Austria and in Turkey. At this time of writing it is reconstructing the political map of the Near East. It is very timely that here we have a work in which we may study, at the pause before the recent wars broke out, the history and character of the peoples who have fought a way to the walls of tottering Constantinople. Prof. Niederle writes enthusiastically, he is proud of the history of his race, he feels the sting of its ages of suffering. Yet that does not detract from the value of the work as a compend of history. He wrote on this topic a few years earlier, a contribution to the work of the Imperial Academy of Sciences at St. Petersburg. It will readily be comprehended that the earlier work was written with reservations, but in this he has told the tale of his race as he thinks it should be told. We know of no work which will supply the detail with which this volume is crowded.

WILLIAM CHURCHILL.

**Jahrbuch des k.k. hydrographischen Zentralbureaus im k.k. Ministerium für öffentliche Arbeiten.** Vol. 15, 1907, and Vol. 16, 1908. Maps, diagrams in each. Wien, 1910 and 1911. 15½ x 11 each.

This publication (quarto), issued annually since 1893, gives a complete review of the hydrographic conditions in Austria-Hungary and in the foreign districts tributary to the waterways of the Empire for each year under review. The year book for 1908 contains, for example, the results of observations from 3,163 stations of which 2,702 are in the Empire and 461 in adjoining territories. The general part (57 pp.) gives tabular summaries of results in each of the river basins with explanatory remarks and graphs showing the daily standard of water at the most characteristic stations. This summarized information for the Empire as a whole is given in complete detail in the thirteen accompanying parts, each relating to the territory tributary to one of the thirteen river basins and each illlustrated by a fine map of the basin under discussion.

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*These notes do not preclude more extended reference later*

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WITH EVANS TO THE PACIFIC. A Story of the Battle Fleet. By Margaret J. Codd. 205 pp. Ills. A. Flanagan Co., Chicago, 1913 (?). 7½ x 5½.

NARRATIVES OF THE INDIAN WARS, 1675-1699. Edited by Charles H. Lincoln. xii and 316 pp. Maps, index. Charles Scribner's Sons, New York, 1913. $2.50. 9 x 6.

HAMILTON, CANADA. Its History, Commerce, Industries, Resources. Issued under the auspices of the City Council in the Centennial Year 1913. 251 pp. Ills. Herbert Lister, Hamilton, Canada. 9 x 6½.

SUMMER PROVINCES BY THE SEA. A description of the Vacation Resources of Eastern Quebec and the Maritime Provinces of Canada, in the territory served by the Canadian Government Railways:—Intercolonial Railway, Prince Edward Island Railway. Written and arranged by Romaine Callender. 310 pp. Ills., index. Intercolonial Ry., Moncton, N. B. 9 x 6½.

A LITTLE JOURNEY TO MEXICO AND CENTRAL AMERICA. For Home and School, Intermediate and Upper Grades. By Marian M. George. 84 pp. Ills., index. A. Flanagan Co., Chicago, 1913 (?). 7½ x 5½.

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THE TRIUMPH OF AMERICAN MEDICINE IN THE CONSTRUCTION OF THE PANAMA CANAL. By J. Ewing Mears. 3d edition, revised and enlarged. 46 pp. Ills. W. J. Dornan, Philadelphia, 1913. 75 cents. 9 x 6.

### AFRICA

THE BARBARY COAST. Sketches of French North Africa. By Albert Edwards. xxvii and 312 pp. Ills. The Macmillan Co., New York, 1913. $2. 8 x 5½.

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## NEW MAPS

EDITED BY THE ASSISTANT EDITOR

*For system of listing maps see p. 74 of this volume*

MAPS ISSUED BY UNITED STATES GOVERNMENT BUREAUS

U. S. GEOLOGICAL SURVEY

*Topographic Sheets*

(*Including Combined and Special Topographic Maps*)

**Arizona.** Winkelman Quadrangle. Surveyed in 1910 and 1911. 1:125,000. 33°0′ - 32°30′ N.; 111°0′ - 110°30′ W. Contour interval 100 ft. Edition of Oct. 1913.

**Colorado.** Red Mesa Quad. Surveyed in 1911. 1:62,500. 37°15′ - 37°0′ N.; 108°15′ - 108°0′ W. Interval 50 ft. Edit. of Oct. 1913.

**Georgia–Tennessee.** Cohutta Quad. Surveyed in 1911. 1:62,500. 35°0′ - 34°45′ N.; 84°45′ - 84°30′ W. Interval 50 ft. Edit. of Nov. 1913.

[Coextensive with the northeast quarter of the old Dalton, Ga.-Tenn., sheet, 1:125,000, originally surveyed in 1886 and revised in 1895.]

**Kentucky.** Buckhorn Quad.* Surveyed in 1911. 1:62,500. 37°30′ - 37°75′ N.; 83°30′ - 83°15′ W. Interval 50 ft. Edit. of Sept. 1913.

[Coextensive with the northwest quarter of the old Hazard, xx Ky., sheet, 1:125,000, originally surveyed in 1889.]

**Maryland.** Indian Head Quad.* Surveyed in 1900 and 1911. 1:62,500. 38°45′ - 38°30′ N.; 77°18′ - 77°0′ W. Interval 20 ft. Edit. of Nov. 1913.

[Coextensive with the southeast quarter of the old Mt. Vernon, Va.-Md., sheet, 1:125,000, originally surveyed in 1885-88, revised in 1894. The Virginia portion of the Indian Head sheet is blank.]

**Minnesota.** Fergus Falls Quad.* Surveyed in 1911. 1:62,500. 46°30′ - 46°15′ N.; 96°15′ - 96°0′ W. Interval 10 ft. Edit. of Sept. 1913.

**Montana.** Cherry Ridge Quad. Surveyed in 1903 and 1910. 1:125,000. 49°0′ - 48°30′ N.; 109°0′ - 108°30′ W. Interval 20 ft. Edit. of Aug. 1913.

[The southern half of this sheet has already been published on the scale of 1:62,500 as the Harlem and Wayne Creek sheets. A note says that the elevations on the Cherry Ridge sheet are 6 ft. too low.]

**Ohio.** (a) Jackson Quad.* Surveyed in 1910-1911. 1:62,500. 39°15′ - 39°0′ N.; 82°45′ - 82°30′ W. Interval 20 ft. Edit. of Oct. 1913.

(b) Era Quad.* Surveyed in 1911. 1:62,500. 39°45′ - 39°30′ N.; 83°15′ - 83°0′ W. Interval 20 ft. Edit. of Oct. 1913.

**Ohio–Michigan.** (a) Alvordton Quad.* Surveyed in 1911. 1:62,500. 41°45′ - 41°30′ N.; 84°30′ - 84°15′ W. Interval 10 ft. Edit. of Oct. 1913.

(b) Wauseon Quad.* Surveyed in 1911. 1:62,500. 41°45′ - 41°30′ N.; 84°15′ - 84°0′ W. Interval 10 ft. Edit. of Nov. 1913.

**Wyoming.** (a) Meeteetse Quad. Surveyed in 1911. 1:62,500. 44°15′ - 44°0′ N.; 109°0′ - 108°45′ W. Interval 25 ft. Edit. of Nov. 1913.

(b) Oregon Basin Quad. Surveyed in 1910-1911. 1:62,500. 44°30′ - 44°15′ N.; 109°0′ - 108°45′ W. Interval 25 ft. Edit. of Oct. 1913.

[Except for the Rock Springs quadrangle, the first topographic sheets to be published on this relatively large scale of any part of Wyoming.]

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* On these sheets woods are shown in green.

XUM

## NORTH AMERICA

### Mexico

**Tamaulipas-Vera Cruz.** General Map of the Mexican Gulf Coast's Oil Fields. Compiled by N. Paulsen-Bildø, Civil Engineer. Tampico, Tamps., Mexico, 1912. 1:100,000. 43 colors. [Five sheets:] (1) 22°55′ - 22°10′ N.; 98°22′ - 97°7′ W. (2) 22°10′ - 21°25′ N.; 98°22′ - 97°7′ W. (3) 21°25′ - 20°40′ N.; 98°22′ - 97°7′ W. (4) 23°40′ - 22°55′ W.; 98°22′ - 97°7′ W. (5) 24°0′ - 23°40′ N.; 98°22′ - 97°7′ W. Published by N. Paulsen, Station O, Box 72, New York, N. Y.

[Valuable general map of the Mexican Gulf coastal plain showing, in colors, the location and extent of the various oil grants. The outline is based on the relevant sheets of the topographic map of Mexico (see *Bull.*, Vol. 45, 1913, pp. 636-637) on the same scale. There are nine symbols for towns according to importance, six for estates, ranches and single houses, three for railroads, four for roads and paths, and four for boundaries. Pipe lines are shown, and distinction is made between wells producing, being drilled and not producing. Forty-three colored symbols are used to distinguish the ownership of the various holdings of oil land. This is the most valuable feature of the map, being based on original compilation, and affords particularly timely information in view of the recent operations of the rebels in the vicinity of Tuxpam.]

**Vera Cruz.** Vera Cruz-Llave. Traced by N. Paulsen, Civil Engineer. Aug. 1912. 1:250,000. 22°45′ - 20°0′ N.; 98°50′ - 96°50′ W. Published by N. Paulsen, Station O, Box 72, New York, N. Y.

[Traced from the official map published by the state of Vera Cruz. Oil wells (producing, being drilled, not producing) shown.]

## AFRICA

**Belgian Congo.** Lage des neuen Vulkans am Kiwu-See nach einer Skizze von Leutnant Kohl. 1:150,000. 1°3′ - 1°43′ S.; 29°5′ - 29°16′ E. Accompanies, on p. 161, "Der vulkanische Ausbruch im Norden des Kiwu-Sees vom 4. Dezember 1912 bis 2. Januar 1913," *Mitt. aus den Deutschen Schutzgeb.*, Vol. 26, 1913, No. 2, pp. 159-163.

[Lava flows from new crater shown. Relief of region immediately to the north of Lake Kivu shown in contours.]

**French Equatorial Africa.** (a) Le Bas-Ogooué et les Lacs. Reconnaissances effectuées en août, septembre, octobre, 1911. 1:1,000,000. 0°20′ - 1°40′ S.; 8°40′ - 10°20′ E.

(b) [27 maps of individual lakes, Nos. 1-9 on the scale of 1:200,000, the remainder, 1:100,000:] (1) Lac Onangé. (2) Lac Ôgèmwe. (3) Lac Ezanga. (4) Lac Azingo. (5) Lac Avanga. (6) Lac Zilè. (7) Lac Adolè. (8) Lac Gômè. (9) Lac Logè. (10) Lac Mômbwè. (11) Lac Nkôvè. (12) Lac Ôgondwè. (13) Lac Igulwè. (14) Lac Dégèlè. (15) Lac Evengô. (16) Lac Myoniè. (17) L. Wombolia. (18) Lac Nkèniè. (19) Lac Nyogo. (20) Lac Nyonjè d'aval. (21) Lac Nyayè. (22) Lac Nyonjè d'amont. (23) Lac Ôgôgwè. (24) Lac Anenge. (25) Lac Manjè. (26) Lac Alombié. (27) Lac Ompindalango.

Accompany, map (a) as Pl. IV on p. 424, maps under (b) as Pls. V-VIII on pp. 425-428, "Les lacs du Bas Ogooué: Mission hydrographique du Gabon" by M. Le Terrier, *La Géogr.*, Vol. 27, 1913, No. 6, pp. 405-428.

[Maps under (b) detailed maps of the lakes accompanying the Ogowe River in its course through the coastal plain. Map (a) a general map showing the whole system of lakes.]

**French Sudan.** (a) Croquis de la Subdivision de Zigueï. Par le lieutenant A. Peignot. 1:500,000. 14°55′ - 14°18′ N.; 15°16′ - 16°10′ E.

(b) Croquis au 100,000e de la région de Bir Alali . . . montrant le parallélisme des massifs dunaires et des *ouaddis*. Levé par le lieutenant A. Peignot. 1:100,000. [14°27′ N. and 15°25′ E.]

Accompany, as Figs. 28 and 29 on pp. 322 and 323, respectively, "Notice

sur la subdivision de Ziguë'' by A. M. Peignot, *La Géogr.*, Vol. 27, 1913, No. 5, pp. 321-330.

[Interesting maps of a small plateau in the savanna region of the Sudan northeast of Lake Chad. The plateau, which consists of clay, is cut by numerous NNW-SSE trending *wadis*. Across these the *harmattan* wind has blown the loose sand originating from the southern edge of the Sahara into series of dunes which have been fixed by vegetational growth. The map distinguishes between the dunes, the *wadis* and the clay subsoil. Map (b) is an enlargement of a section of map (a).]

**German East Africa–British East Africa.** (a) Das abflusslose Gebiet des nördlichen Deutsch-Ostafrika. 1:1,000,000. 0°50′ - 4°35′ S.; 32°46′ - 37°9′ E. [Three maps:] (1) Wasserscheiden und Landschaftgrenzen. Entworfen von F. Jaeger. 4 colors. (2) Geologische Karte. Entworfen von F. Jaeger. 13 colors. (3) Vegetationskarte. Entworfen von F. Jaeger. 12 colors.

(b) Reiseweg Dr. F. Jaeger's in der Massai-Steppe. 1:1,000,000. 3°22′ - 5°41′ S.; 37°5′ - 38°33′ E.

Accompany, maps under (a) as Karten 4, 5, and 6, respectively, and map under (b) on p. 3, ''Das Hochland der Riesenkrater und die umliegenden Hochländer Deutsch-Ostafrikas: Teil II (Länderkundliche Beschreibung)'' by F. Jaeger, *Ergänzungsheft Nr. 8 der Mitt. aus den Deutschen Schutzgeb.*, 1913.

[Maps under (a) are general maps of the district lying between Mt. Kilimanjaro and Lake Victoria, based on Sheet 17 of the Grosser Deutsche Kolonialatlas, $a_1$ representing topography, $a_2$, geology, and $a_3$, vegetation. Map $a_1$ represents relief in approximate contours and shading in brown. The detailed surveys which accompanied Teil I of this monograph (maps (2) and (3) listed under ''German East Africa'' in *Bull.*, Vol. 43, 1911, pp. 547-548) are incorporated on this map. Besides relief, watersheds and boundaries of natural regions are also shown, as the title indicates. On map $a_2$ twelve geological formations are distinguished, and faults are shown especially prominently in view of their importance in the structure of this region, which includes the Great Rift Valley. Three kinds of faults are distinguished according to the height of the throw. On map $a_3$ eleven plant formations are shown. Map (b) is a black-and-white text map showing mainly the Pangani depression, with relief in approximate contours. The monograph which these maps accompany, and especially Chapter 16, is a model of a systematic regional treatment according to modern geographical methods.]

**Italian Somaliland.** (a) Somalia Italiana: Zona d'Influenza Commerciale. 1:4,000,000. 12°40′ N. - 0°40′ S.; 37° - 53° E. 6 colors.

(b) Circosrizioni Amministrative e Militari nella Somalia Italiana Meridionale. 1:2,000,000. 5°20′ N. - 0°20′ S.; 41°40′ - 48°40′ E. 8 colors.

(c) Carta Dimostrativa della Somalia Italiana Meridionale compilata da E. Carcoforo. Riproduzione di M. Checchi ed A. Marconi. 1:1,000,000. 6°0′ N. - 0°20′ S.; 42°0′ - 46°40′ E. 6 colors. With inset: [Northern continuation of the Webi Shebeli]. 1:750,000. 6°0′ - 5°15′ N.; 43°50′ - 45°0′ E. 1 color.

Accompany *Rivista Coloniale*, Vol. 8, Part I, Nos. 2 and 3, and Part II, No. 1, respectively.

[Map (a) shows the political divisions of the Somali Peninsula (French, British and Italian Somaliland and Abyssinia) and the chief routes of communication. Map (b) represents the civil and military administrative units and indicates, by means of 26 symbols, the location of such offices as custom houses, post offices, wireless telegraph stations, etc. These two maps were previously published in ''La Somalia Italiana nei tre anni del mio governo'' by G. De Martino, the governor of the colony. Map (c) is an important large-scale map of southern Somaliland, which distinguishes between (1) cultivated areas and pastures, (2) scrub and (3) forests. Roads, as far as built, and routes traversed by Europeans and from native report are shown. This map, which is officially published by the Government of Italian Somaliland, also appears in *L'Africa Italiana*, Vol. 32, 1913, No. 3-6.]

**Portuguese West Africa–German Southwest Africa.** Karte des Deutsch-Portugiesischen Grenzgebiets in Südwestafrika. Bearbeitet unter Leitung von Paul Sprigade von H. Nobiling. Das portugiesische Gebiet auf Grundlage einer Bearbeitung von Dr. Max Groll. Blatt 2. 1:500,000. 15° - 19° S.; 15°15′ - 19°10′ E. 5 colors. Accompanies, as Karte 4, *Mitt. aus den Deutschen Schutzgeb.*, Vol. 26, 1913, No. 2.

[The second sheet of this important three-sheet map of the adjoining portions of Portuguese West and German Southwest Africa, the first of which was listed, with comment, under the same head in the *Bull.*, Vol. 45, 1913, No. 9, p. 718. The present map, which adjoins the first sheet to the east, includes the northern part of the Etosha Salt Pan.]

**Togo.** Karte des Sechsherrenstockes (bisher Kunjagebirge genannt). Nach den Aufnahmen des Regierungsrats Dr. H. Gruner unter Leitung von P. Sprigade bearbeitet und gezeichnet von H. Ketzer. 1:50,000. 7°22.5′ - 7°6.5′ N.; 0°19.3′ - 0°29.6′ E. 2 colors. Accompanies, as Karte 3, "Begleitworte zur Karte des Sechsherrenstocks (Amandeto)" by H. Gruner, *Mitt. aus den Deutschen Schutzgeb.*, Vol. 26, No. 2, pp. 127-158.

[The Sechsherrenstock, or, as they have been called heretofore, the Kunja Mts., are a western outlier of the Togo Mts., lying between their main axis and the depression of the Volta valley. They were almost unknown until the expeditions of the author, on whose route surveys the map is based. Relief shown in approximate contours in brown; boundaries of native districts in red.]

## WORLD AND LARGER PARTS

**World.** Carte Générale Bathymétrique des Océans. Publiée par le cabinet scientifique de S.A.S. le Prince de Monaco. [Mercator's projection; equatorial scale, 1:10,000,000.] [Eight sheets:] (1) Feuille A I. Revised to May 1, 1912. 46⅔° N. - 0°; 90° W. - 0°. 19 colors. (2) Feuille A II. Revised to May 1, 1912. 46⅔°; N. - 0°; 180° - 90° W. 17 colors. (3) Feuille A III. Revised to Dec. 31, 1912. 46⅔° N. - 0°; 90° - 180° E. 22 colors. (4) Feuille A IV. Revised to Dec. 1, 1912. 46⅔° N. - 0°; 0° - 90° E. 19 colors. (5) Feuille A′I. Revised to July 1, 1913. 0° - 46⅔° S.; 90° W. - 0°. 19 colors. (6) Feuille A′II. Revised to July 1, 1913. 0° - 46⅔° S.; 90° - 180° W. 16 colors. (7) Feuille A′III. Revised to Sept. 1, 1913. 0° - 46⅔ S.; 90° - 180° E. 20 colors. (8) Feuille A′IV. Revised to Sept. 1913. 0° - 46⅔° S.; 0° - 90° E. 17 colors. Institut Océanographique, Paris.

[Eight sheets (comprising the zone between 46⅔° N. and 46⅔° S.) of a new edition being published of this standard bathymetrical map of the oceans. The distinctive feature of the new edition is that the relief of the land is also shown. The same contour intervals are used for the hypsometric tints in brown as for the bathymetric tints in blue, namely 0, 200, 500, 1000, 2000 meters and so forth for every 1000 meters. This uniform treatment of both the land and water areas increases the value of the map in making possible a correlation of the structural features of the globe. Incidentally it reveals the well-known fact of how inferior is our knowledge of the form of the ocean floor as compared with that of the land surface: vast areas have not yet been reached by the sounding lead (for valuable survey of known areas see map by L. Carrier, listed under "World" in the *Bull.*, Vol. 44, 1912, p. 239). The changes necessitated by the addition of new data is well brought out by comparing the new with the old edition of Sheet A III, which includes some of the troughs of the Western Pacific. Hardly an isobath has retained its original form, and even islands have disappeared. Although the Philippine, Liu-Kiu, Pelew and Yap Troughs are so designated on this sheet, the substitution of the artificial system of designating troughs by the names of vessels or men connected with their exploration for the more rational geographical names used in the first edition, as the Tuscarora and Nero Deeps for the Japan and Mariana Troughs, respectively, seems regrettable. On the other hand, a laudable tendency is noticeable on this and other sheets to restrict the area of the platforms of oceanic islands, which on the previous edition appeared too broad. The general change in the color scheme for water on all the sheets has, if anything, increased the plasticity of the map. Deeper shades of blue are used, as a

rule; this allows the use of a pale blue for the continental shelf instead of the white of the previous edition without impairing the fundamental contrast between it and the abyssal depths. Each sheet is accompanied by a list of sources for both bathymetry and hypsometry, the sources for the latter sometimes being perforce of so general a nature as school wall maps.]

EDUCATIONAL

**United States.** The Illustrative Historical Maps: Territorial, Administrative, Political, Discoveries, Military Campaigns. By E. G. Foster. [Thirty-three plates, on various scales and in 1-6 colors, viz.:] 1. Early Explorers and Discoverers. 2. Spanish Explorations in North America. 3. (a) French Explorations. (b) The Dutch and Swedes in America. 4. (a) The London Co., 1609. The Plymouth Co., 1620. (b) The London and Plymouth Companies, 1606. 5. (a) The New England Grants. (b) The Development of the New England States. 6. (a) Grants to the Middle Colonies. (b) The Development of the Middle States. 7. (a) The Southern Grants. (b) The Development of the Southern States. 8. North America, from 1755 to 1763. 9. Result of the French and Indian War, 1763. 10. (a) The Thirteen Colonies; Proclamation Line, 1763, and Quebec Act, 1774. (b) The Early Campaigns of the Revolutionary War. 11. Northern Campaigns of the Revolutionary War. 12. Washington's Campaigns. 13. Southern Campaigns of the Revolutionary War. 14. (a) Territorial Claims of the Thirteen Colonies. (b) The Northwest Territory and the Territory Southwest of the Ohio River. 15. Drainage Map. 16. Our Country at the Close of the Revolutionary War, 1783. 17. [Diagram showing the development of the political parties.] 18. Louisiana Purchase of France, 1803. 19. War of 1812. 20. The Missouri Compromise and Florida Treaty. 21. The United States, 1837, and the Republic of Texas. 22. (a) The Oregon Country. (b) The Maine Boundary, and Webster-Ashburton Treaty. 23. Our Country, 1846. 24. War with Mexico. 25. Our Country at the Close of the Mexican War, 1848. 26. The Compromise of 1850. 27. The Kansas-Nebraska Act, 1854. 28. Our Country, 1861-1865. 29. Grant's Campaigns in the West: The Siege of Vicksburg and Relief of Chattanooga. 30. Campaigns of Buell and Bragg. 31. Sherman's March to the Sea and Hood's Retreat. 32. Campaigns of the Army of the Potomac vs. the Campaigns of Robert E. Lee. 33. United States and Her Possessions, 1910. Published by Rand, McNally & Co., Chicago and New York. Revised 1910. Price $25.

[A serviceable set of wall maps illustrating the history of the United States. Aside from the first three plates, which deal with the history of discovery, the majority of the maps represent territorial and administrative changes and military campaigns. On each map is printed a concise statement of the events and conditions illustrated by it. On the whole the maps are drawn boldly enough for legibility at a distance. Several of the large-scale maps, however, are somewhat crudely drawn, as for instance map (11), on which, in the manner of a child's drawing, the region about Montreal and the Ottawa River is compressed, in defiance of scale, in order to include it on the plate, or map (12), on which the environs of New York are so inaccurately delineated that the shades of Washington, Howe and Clinton might have difficulty in recognizing respectively the sites of the Battle of Long Island, the disembarkment at Gravesend Bay or the voyage around the southeastern side of Staten Island. The maps are printed on stout paper and are held together by rings which pass through eyelets on their lower edges. By means of an ingenious rack arrangement, they can be hung from eyelets in their upper edges and displayed by unhooking them and dropping them down one by one.]

**Other Maps Received**

EUROPE

**Austria-Hungary.** Übersichtskarte der Betriebslinien der Ersten k. k. priv. Donau-Dampschiffahrts-Gesellschaft. 1:2,500,000. Auflage 1910. Ausgeführt im k. u. k. Militärgeographischen Institute, Wien.

Übersichtskarte des Donau-Oder-Weichsel- und des Weichsel-San-Dniester-

XUM

Kanales. Tafel 1. 1:750,000. Ausgeführt im k. u. k. Militärgeographischen Institut. [Wien].

Carte Géologique de la Hongrie, publiée par la Société Géologique de Hongrie avec le concours de l'Institut Royal Géologique de Hongrie et de Mr. A. de Semsey. 1:1,000,000. Budapest, 1896.

**Balkan States.** Königreich Bulgarien und die zentralen Balkanländer, zwischen Adria und Pontus. 1:864,000. III. Auflage. Äussere Grenzen nach dem Londoner Präliminarfrieden, innere Grenzansprüche Juni 1913. Nach Originalmaterialien zusammengestellt von Dr. K. Peucker. Artaria & Co., Wien.

[For earlier edition see under "Balkan Peninsula," *Bull.*, Vol. 45, p. 560.]

Kriegskarte der Balkanhalbinsel. Paul Langhans, [author]. 1:1,150,000. [With insets]: Strasse der Dardanellen, 1:500,000; Der Bosporus, 1:500,000; Constantinopel, 1:150,000; Athen und Piraeus, 1:150,000; Mitteleuropa und der Orient: Kretas strategische Stellung im östlichen Mittelmeer, 1:15,000,000. Auf Grund von Karten aus Stielers Handatlas von C. Vogel u. B. Domann. Justus Perthes, Gotha.

Tageskarte zur Serbischen Frage. 1:1,000,000. With inset: Mitteleuropa und der Orient. 1:10,000,000. Justus Perthes, Gotha.

Gli Stati Balcanici, Grecia e Impero Ottomano (Albania-Macedonia-Asia Minore). 1:2,800,000. G. B. Paravia & Co., [Toronto].

**France.** Massif du Ballon d'Alsace: Sentiers skiables, Carte au 1:50,000, de la Société de Ski de Belfort. [Belfort, 1912].

**Germany.** Höhenschichtenkarte vom Steigerwald. Herausgegeben im Auftrage des Steigerwald-Klubs unter Mitarbeit des derzeitig 1. Vorsitzenden P. Arauner, Kitzingen a. M. 1:100,000. H. Kahle, Eisenach.

Verwaltungsbereich der Königlichen Generaldirektion der Sächsischen Staatseisenbahnen, 1912. 1:600,000. [Königlich Sächsische Staats-Eisenbahnen, Dresden].

**Iceland.** Generalstabens Topografiske Kort. Sheets: 13 Bardaströnd S. A.; 14 Breidifjördur N. A.; 23 Gufudalur S. A.; 24 Fellströnd N. A.; 24 Fellströnd S. V.; 24 Fellströnd S. A.; 24 Fellströnd N. V.; 25 Hnappadalur N. A.; 33 Ospakseyri S. V.; 35 Nordurárdalur N. V.; 35 Nordurárdalur S. V. 1:50,000. Generalstabens topografiske Afdeling. Kjöbenhavn, 1913.

**The Netherlands.** Noordzee: Zeegat aan den Hoek-Van-Holland. 1:7,500. Samengesteld in 1912. Ministerie van Marine, Afdeeling Hydrographie, [The Hague]. Fl. 1.

**Norway.** Topografisk kart over kongeriget Norge. Sheets: 1 D. Mandal; 5 B. Grimstad; Z 2. Berlevaag; 32 B. Tryssil; 32 D. Engerdalen; 43 C. Holtaalen; 45 D. Edö; 48 B. Fröya; 56 A. Vikten. 1:100,000. Udgivet af Norges Geografiske Opmaaling, [Christiania].

Svolvaer Havn. 1:12,500. Utgit av Norges Geografiske Opmaaling. Kristiania 1913.

Aakre og Matrefjord. 1:100,000. Utgit av Norges Geografiske Opmaaling. Kristiania 1913.

Jernbaner i Norge. 1:2,600,000. With insets: Dampskibsruter og Forbindelser med Udlandet. 1:13,500,000; [Trondhjem district, 1:860,000]; [Bergen district, 1:860,000]; [Kristiania district, 1:860,000]. Statsbanernes Forlag, Kristiania, 1913.

**Scandinavia.** Generalkarta ofver Sverige, Norge och Danmark samt angransande delar af Östersjöländer, jämte Järvägs-Kommunikationer femte Tillökade och Förbättrade Upplagan. Författad och sammandragen i fyra Blad. I Skalan 1:1,000,000 af Nat. Storleken af August Hahr. Stockholm. Beijers Bokförlagsaktiebolag. [With insets: Norges Nordligaste Amt; Skanes Järnvägar, 1:700,000].